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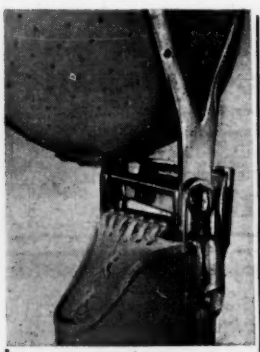

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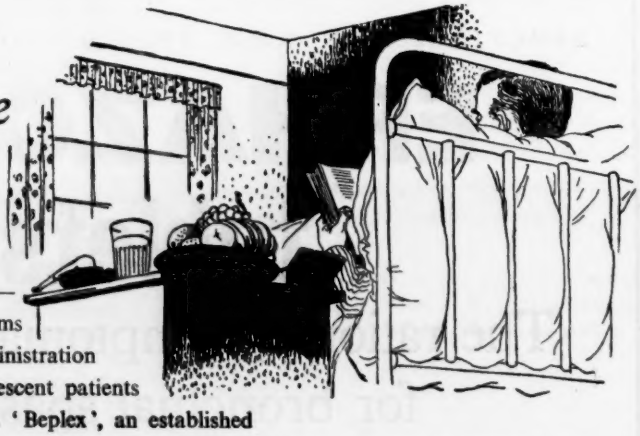

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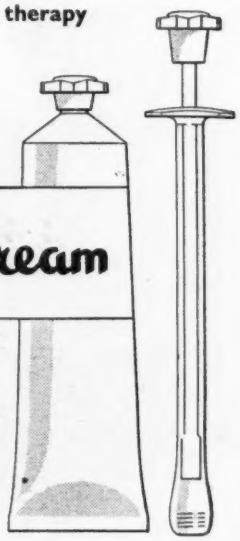

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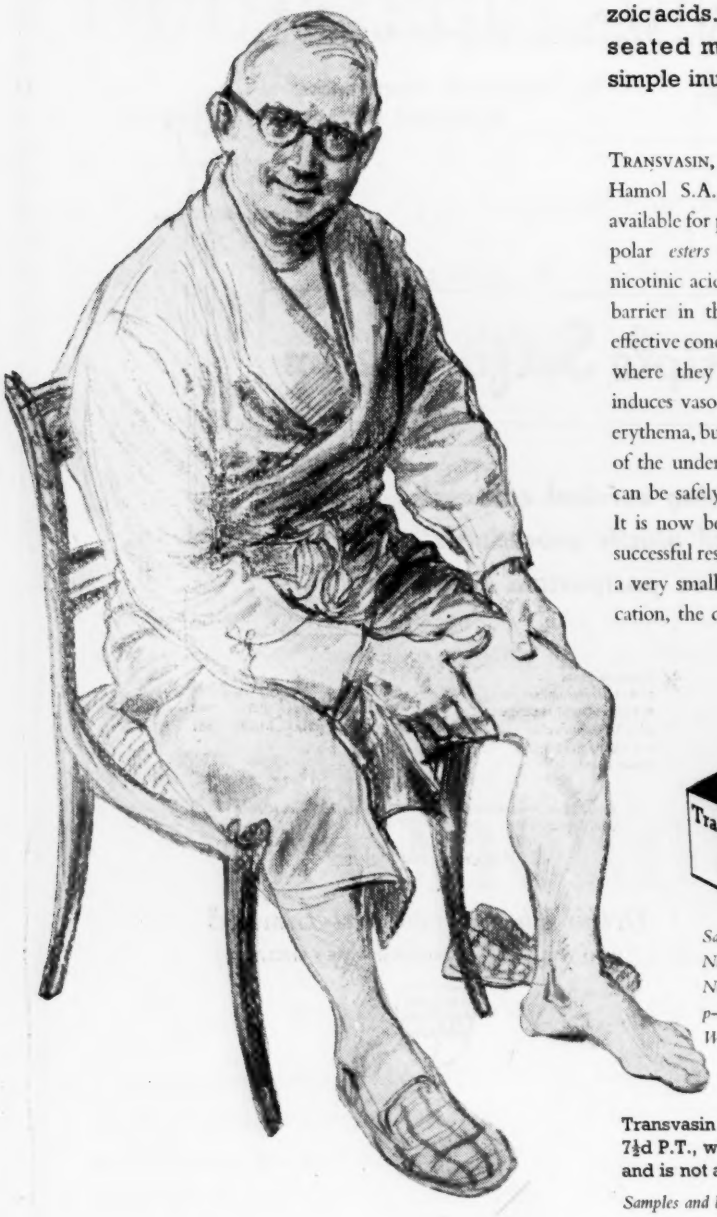

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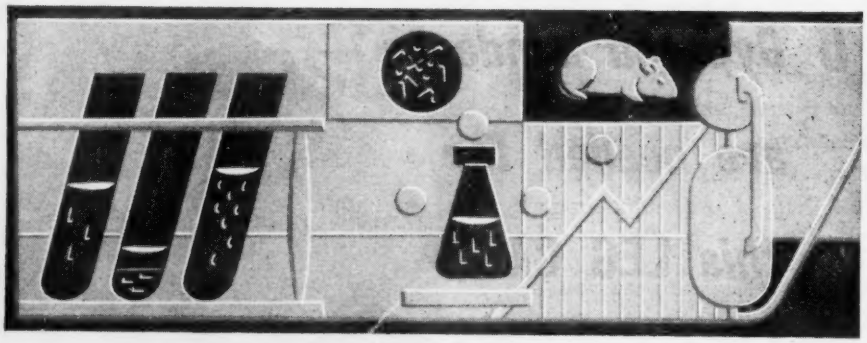

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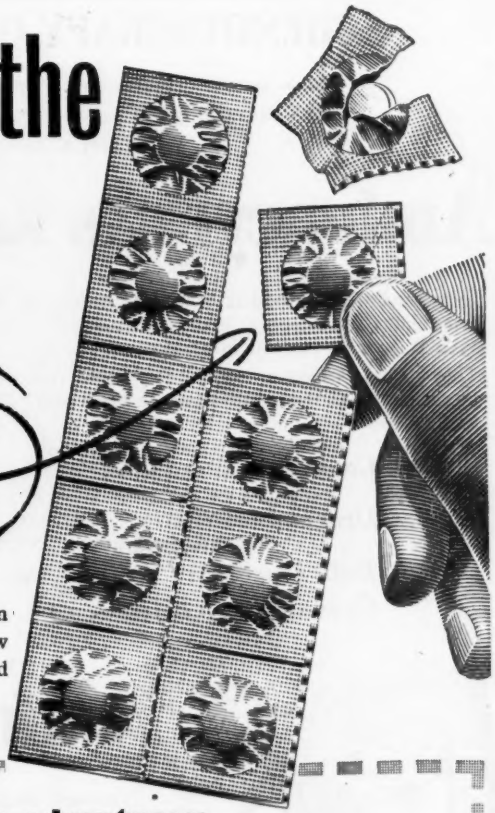

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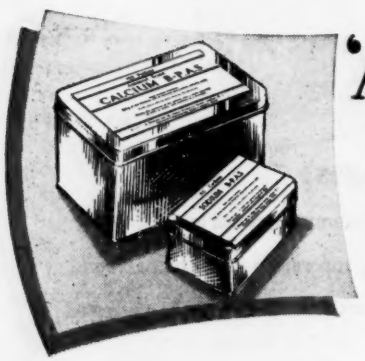

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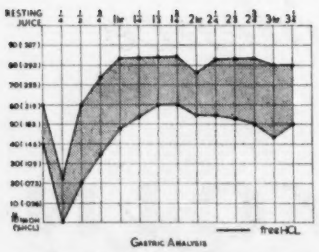

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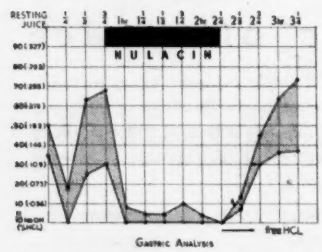

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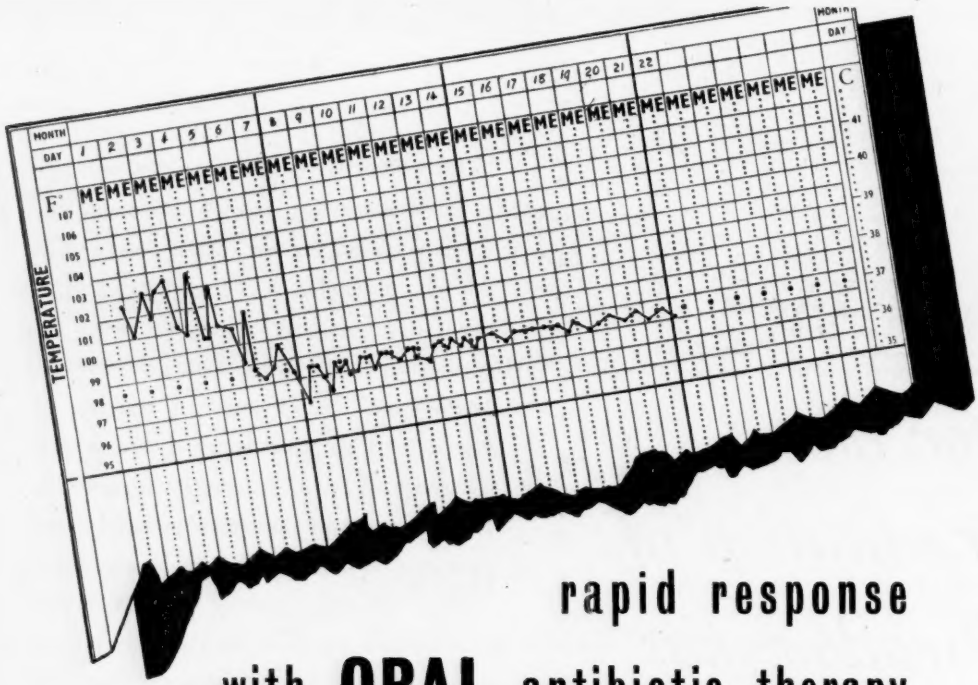

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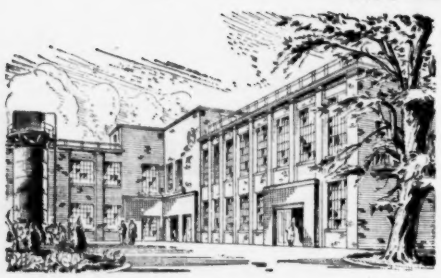

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REMARKS ON THE ÆTIOLOGY OF BRONCHOGENIC CARCINOMA *

EVARTS A. GRAHAM
M.D. Rush, F.A.C.S., F.R.C.S.(Hon.)
BIXBY PROFESSOR EMERITUS OF SURGERY, WASHINGTON UNIVERSITY
From the Department of Surgery, Washington University School of Medicine and Barnes Hospital, St. Louis, Missouri

PROBABLY everyone here is aware of the claim that bronchogenic carcinoma is a much more common condition than it was thirty or thirty-five years ago. Although there are still a few who, like Smithers of the Brompton Hospital, are sceptical of this claim (Smithers 1953), the overwhelming majority of those who have studied the question are thoroughly convinced there has been a striking increase in the incidence of the disease which cannot be explained by the greater longevity of people nowadays or by better diagnosis. Few realise, however, that the very remarkable increase is unique in the field of cancer. Probably never before in medical history has a cancer of a particular organ shown so rapid an increase. Other common cancers with which we are familiar are showing either no change or perhaps even a slight decline in incidence (fig. 1). Cancer of the respiratory system in the United States, and I believe in the United Kingdom, has now jumped to the leading position, superseding cancer of the stomach for first place.

One other generality that should be mentioned here is that the condition is much more frequent in men than in women. Various ratios are given in the literature. An average of them shows that bronchogenic carcinoma is about six times more frequent in males than in females. This fact in itself arouses curiosity because there is no reason whatever for assuming that there is any anatomical or physiological difference between the lungs of the two sexes.

If we accept these facts it behoves us to try to find an explanation for them. Immediately of course the idea occurs that the explanation of the very rapid increase in incidence must lie in something pertaining to our culture or habits in the last thirty-five years which differs from those of a previous time. At once the possibility of some factor connected with the motor-car comes to mind, since this is the motor age. In a study, however, of 857 cases of bronchogenic carcinoma by Wynder and myself (1951), with special reference to industrial exposures as possible ætiological factors, we found no significant increase of this cancer in garage men, automobile mechanics, chauffeurs, and oil-field workers. Certain other occupational exposures are known to be associated with a greater risk of developing lung cancer than the risk run by the general population. The most striking examples are the well-known studies made on the Schneeberg and Joachimsthal miners with incidences of 40% and 48% respectively of deaths from lung cancer in the two places. Lorenz (1944) has published an admirable review of this subject. Also, more recently, it has been found that workers in the chromate industry have a higher death-rate from pulmonary cancer than does the general population (Mancuso and Hueper 1951). These industrial exposures, however, could not possibly explain the large increase in the incidence of lung cancer, because so few people are involved. Also, despite the fact that small amounts of carcinogenic agents have been found in the atmospheric "smog" of some cities, as, for example, in Los Angeles by Kotin (1954), it would be difficult to explain the lower incidence of the disease in the women who inhale the same atmosphere as the men.

Relation to the Tobacco Habit

As long ago as 1912 Adler, of New York, who wrote the first monograph on bronchogenic carcinoma, at a time when the condition was relatively rare, suggested that perhaps tobacco-smoking might be of some importance in the ætiology. Since that time the list of those who have made the same suggestion has become a long one. The difficulty, however, has been that in most instances only the suggestion was made and nothing was done to try to find out. What was needed was a statistical study on a sufficiently large number of patients to make the results significant.

In May, 1950, Wynder and I published such a study, based on 684 proven cases. Nearly all the patients were in the Barnes Hospital, St. Louis, but they came from many places in the Middle West and Southwest of the United States. They were interviewed about their

* From the second Sir John Fraser lecture delivered at the University of Edinburgh on May 11, 1954.

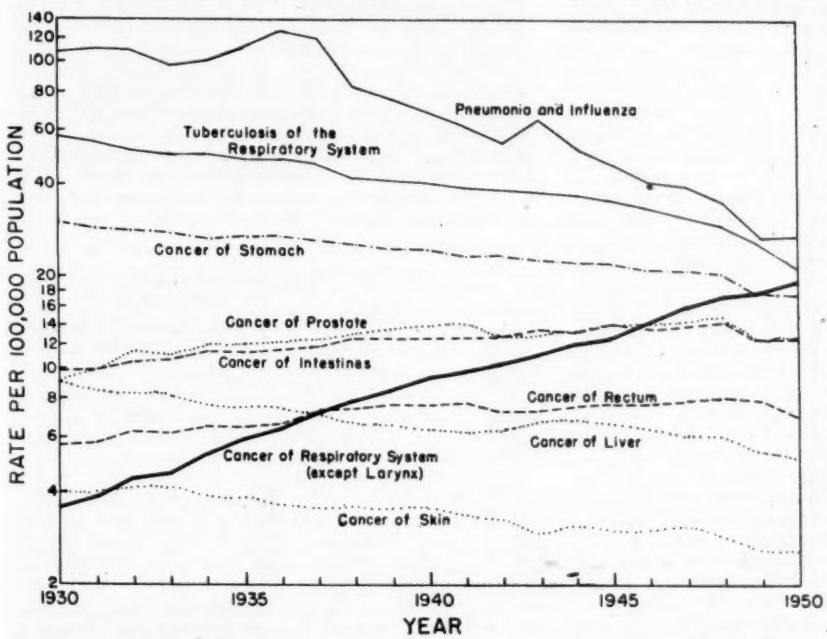

Fig. 1—Death-rates for selected respiratory diseases and sites of cancer among white males, United States 1930–50. (Rates standardised for age on the 1940 population.) Showing the rapid rise in the curve of incidence of cancer of the respiratory system in comparison with the nearly straight lines of other common cancers. (Prepared by Dr. E. Cuyler Hammond, chief statistician of American Cancer Society, and reproduced with his permission.)

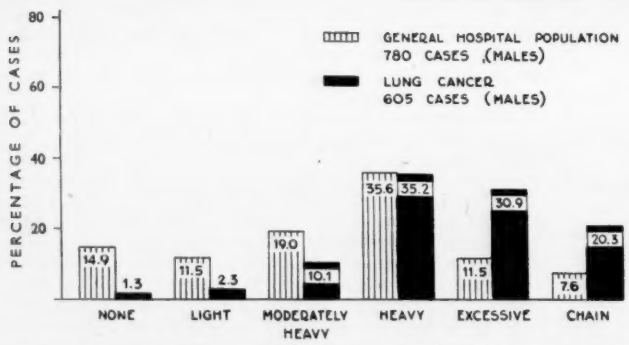

Fig. 2—The amount of cigarette-smoking in 605 male patients with proven bronchogenic carcinoma as compared with 780 males over 35 years of age without cancer of the lung (Wynder and Graham 1950).

The arbitrary classifications of smoking are as follows: Non-smokers (less than one cigarette per day for more than twenty years); light smokers (up to one-half pack per day for more than twenty years); moderately heavy (one-half to three-quarters of a pack); heavy smokers (three-quarters to a whole pack); excessive smokers (one to one-and-three-quarters packs); chain smokers (more than one-and-three-quarters packs).

smoking habits by one of three young women who used a standard questionnaire. In our study we found that of 605 men with bronchogenic carcinoma, other than adenocarcinoma, no less than 86·5% had smoked from about a pack to more than two packs of cigarettes a day for at least twenty years †; and among these men with the two common types of carcinoma (epidermoid and undifferentiated) only 1·3% were non-smokers. Of a control group of 780 men without lung cancer 54·7% had a similar history of heavy smoking of cigarettes, and 14·9% were non-smokers (fig. 2). We found also that no less than 72% of the men with lung cancer stated that they had smoked for from thirty to fifty years. Another important finding concerned the smoking habits of women. Although it is commonly stated that women smoke at least as much as men, if not more, the findings of our study of 552 women patients without lung cancer and above the age of 35 revealed the rather astonishing fact that 79·6% of them were non-smokers, as compared with only 14·9% of men in a similar control group (fig. 3). It is clear, therefore, that, at least in the United States, it is not true that women in general smoke as much as men. It is the young women and the girls who do the heavy cigarette-smoking, not the women of the cancer age. Moreover, the young women have not been smoking for the period of more than twenty years which seems to be necessary in order to develop a cancer of the lung.

In September of that year appeared in England the well-known statistical study of Doll and Hill (1950). Although it happened to be published a few months after ours it was begun about the same time and was carried on entirely independently of ours. It was based on about the same number of patients, who were interrogated in about the same manner as ours. Their results also closely resembled ours. For example, of 649 men with cancer of the lung only 0·3% were non-smokers. A high proportion of the patients with lung cancer were in the heavier-smoking categories. Doll and Hill conclude that their figures "suggest that, above the age of 45, the risk of developing the disease increases in simple proportion with the amount smoked, and that it may be approximately 50 times as great among those who smoke 25 or more cigarettes a day as among non-smokers."

Actually, in addition to our own (Wynder and Graham 1950, 1951) and that of Doll and Hill (1950) ten different statistical studies have been reported (Breslow et al. 1954, Dungal 1950, Gsell 1951, Kouloumies 1953, Levin et al. 1950, McConnell et al. 1952, Mills and Porter 1950, Sadowsky et al. 1953, Schrek et al. 1950, Wynder and Cornfield 1953). Some are less significant than others because the numbers of cases were too small. Nevertheless, all the studies reported point in the same direction in showing a probable relation between excessive cigarette-smoking and the production of bronchogenic carcinoma. No study has failed to show a relation.

Carcinogens in Tobacco Smoke?

Although the statistical studies suggest very strongly that excessive cigarette-smoking plays an important part in the ætiology of lung cancer, it is obvious that experimental production of cancer with cigarette smoke would make the evidence stronger. The literature on this subject is long. It has been carefully reviewed in a recent article by Wynder, Croninger, and myself (1953). For the most part the results have been negative, though a total of seven epidermoid cancers of the skin have been reported as having been obtained in mice with products of cigarette smoke, out of many animals used. Most workers who have attempted to incite experimental cancer with tobacco products have used rabbits. Roffo (1939) reported the successful production of carcinoma in rabbit ears after painting them with a distillate of tobacco, but Sugiura failed in his attempt to reproduce Roffo's results. Also Flory (1941) succeeded in obtaining only "carcinomatoids" in rabbit ears after application of a tobacco distillate.

It seemed to us, after studying the literature, that the occurrence of cancer in the experimental animals was so rare that it offered little if any conclusive evidence beyond that produced by the statistical studies. Moreover, little was known or stated about the strains of mice used. This is a very important matter because, for the experiments to have value, a strain of mice must be used which is known not to develop spontaneous cancers of the skin. Accordingly we undertook an experimental study to determine whether we could produce cancer by

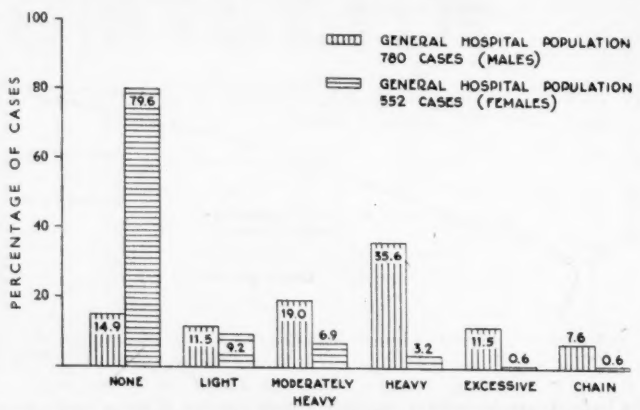

Fig. 3—This chart (Wynder and Graham 1950) refutes the common belief that women smoke as much as men, at least in the St. Louis area. The statistics were obtained by questioning 780 male and 552 female patients in the Barnes Hospital. None of the patients had a bronchial carcinoma and all were more than 35 years old.

† A pack contains 20 cigarettes.

painting the skin of mice of a suitable strain with tar collected from cigarette smoke. For our purpose we used mice belonging to the inbred strain known as CAF_1 which is free from spontaneous tumours of the skin. This strain has been developed in Dr. C. C. Little's laboratory at Bar Harbor, Maine.

We devised a machine with which we smoked 60 cigarettes at a time by means of a small motor. The smoke was drawn into flasks which were cooled with dry ice. The sudden cooling of the smoke resulted in the precipitation of the tar from the smoke. This tar was dissolved in acetone and the solution was painted on the skin of the mice. Thrice-weekly paintings of a solution of one part of tar to one part of acetone were used. The acetone proved to be an inert substance which failed to produce even any irritation of the skin of control mice which were painted with that substance alone.‡

Of 81 tarred CAF_1 mice, 59% (26 females and 22 males) developed papillomas. Of these papillomas, 8·6% regressed. More important, however, was the fact that

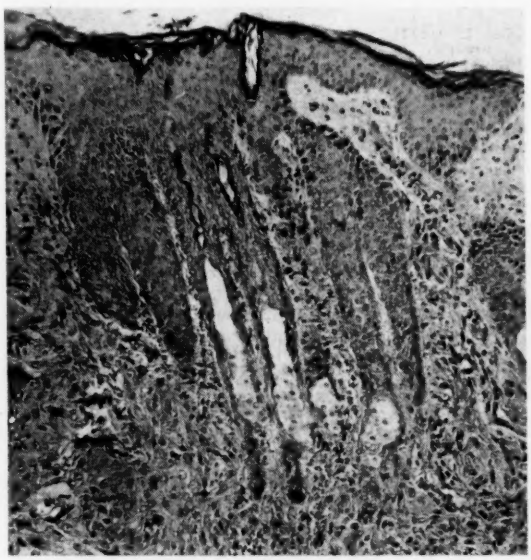

Fig. 4—Carcinoma induced in mouse by painting with tobacco tar (× 50).

of the 81 tarred mice 44·4% (or 36 mice) developed epidermoid cancer of the skin (figs. 4 and 5). In most instances there was only one cancer but in several cases there were two, and in one mouse actually three cancers appeared on the painted area. In view of the preponderance of incidence of lung cancer in the human male it is of interest that in the experimental animals 25 of the cancers occurred in females and 11 in males.

Several of the cancers produced in the mice have been successfully transplanted into other mice. In one example, successful transplantation was carried out for twenty generations.

One of the striking results of the experiments was the fact that the average time of appearance of a cancer was after seventy-one weeks of painting. This period of time represents a little more than one-half the average life-span of the mouse, which is ordinarily a little more than two years. The duration of painting required to produce a cancer in a mouse is thus equivalent to the approximate thirty to fifty years of smoking in the human required to produce a bronchogenic carcinoma; for that period is a little more than one-half the life-span of the human.

‡ For details of the experimental work the reader should consult our original article (Wynder, Graham, and Croninger 1953).

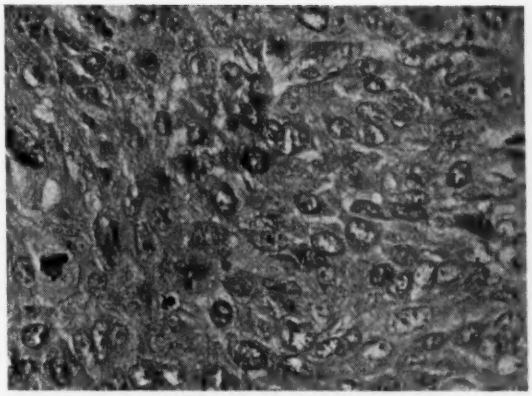

Fig. 5—Same lesion (× 200).

These experimental results demonstrate that there is something in the smoke of cigarettes which is capable of producing carcinoma of the skin of mice.

Significance of the Findings

What is the significance of the findings? We find that many thoughtful people believe that our experimental results bring to the statistical studies additional convincing evidence of an ætiological relation between excessive cigarette-smoking and bronchogenic carcinoma. There are others, however, who remain unconvinced. These "die-hards" state that so far no proof of the relation has been presented. One must grant that indeed no absolute proof has been offered. But what sort of proof is called for? To satisfy the most obdurate of the die-hards it would be necessary to take the following steps:

(1) Secure some human volunteers willing to have a bronchus painted with cigarette tar, perhaps through a bronchial fistula.

(2) The experiment must be carried on for at least twenty or twenty-five years.

(3) The subjects must spend the whole period in air-conditioned quarters, never leaving them even for an hour or so, in order that there may be no contamination by a polluted atmosphere.

(4) At the end of the twenty-five years they must submit to an operation or an autopsy to determine the result of the experiment.

I will say to those who wish to volunteer for such an experiment, "please form a queue to the right; no crowding please."

Perhaps the animal experiments might be somewhat more convincing if the cancers had been produced in the bronchi instead of in the skin; but there can be no doubt that we have demonstrated the presence of a carcinogenic factor in cigarette smoke. The technical experimental difficulties in the attempt to produce a cancer of the bronchus in a mouse are very great. Long-term inhalation experiments for the most part have been fatal because the mouse is relatively intolerant to nicotine. Indeed, after the cancers had ulcerated, we were compelled to use denicotinised tar in the painting of the animals because fatal amounts of nicotine were absorbed through the raw surface of the ulcer. If larger animals are used, in order to create bronchial fistulæ more easily, the experiment must be carried on for a much longer time in view of the apparent rule that the contact with the tar must be for approximately one-half the life-span of the animal. Actually for a period of two and a half years we have been painting some bronchial fistulæ in dogs, but we expect to have to continue the experiment for about three years longer.

Different Kinds of Carcinoma

One source of the disagreement among those who are interested in this subject is, it seems to me, the common opinion that bronchogenic carcinoma, or primary cancer of the lung, is a single entity. (The statisticians, who know little, if anything, about pathology, are especially likely to fall into that error.) Actually, there is much evidence that there are at least three distinct varieties of this disorder, differing from each other so much that they may be regarded as three distinct diseases, with different ætiological factors.

I fully realise that one should not place too great reliance on differences and classifications based on the morphological appearance and arrangement of cells. As a rule there is no great difficulty in distinguishing between a typical epidermoid (or squamous) carcinoma and an adenocarcinoma, but there are a good many cases in which there is very little differentiation. Usually in such examples it is possible to recognise a tendency towards the development of an epidermoid carcinoma, and we are therefore accustomed to speak of cancers showing such characteristics as undifferentiated epidermoid carcinomas.

We are inclined, then, to recognise as the three principal varieties of bronchogenic carcinoma (1) the epidermoid or squamous, with its subhead of undifferentiated carcinoma, (2) the adenocarcinoma, and (3) the so-called alveolar-cell carcinoma. The tumour which you British often designate as the oat-cell carcinoma is not regarded by us as a separate variety.

That which goes by the name of alveolar-cell carcinoma is rare in comparison with the other varieties, but from year to year more cases are recognised. It closely resembles the disease of sheep known as "jagziekte," and there is good reason to believe it is due to a virus.

In our experience by far the most common bronchial carcinoma is the epidermoid, with its variant the undifferentiated type. It constitutes more than 90% of the cases in our series. It is this variety which is apparently associated with excessive cigarette-smoking and it is found much more often in the male than in the female.

The typical adenocarcinoma has many characteristics, both clinical and pathological, which set it apart from the epidermoid cancer. Statistically it seems to have a much less close relation to smoking. For example, in our series, out of 39 men with adenocarcinoma no fewer than 4 (or 10%) were non-smokers, whereas among the other 605 men with bronchogenic carcinoma the proportion of non-smokers was only 1·3%. More striking is the fact that of 15 women with adenocarcinoma 13 were non-smokers. Another difference noted is that the very great preponderance of incidence of epidermoid carcinoma in the male sex does not hold to the same degree for the adenocarcinoma. Again, as shown by Olson (1935) and others, the primary carcinoma of the lung occurring in the younger age-groups is nearly always adenocarcinoma. Indeed Olson states that of 576 cases of lung cancer compiled from the literature by Brunn in 1926, 12% were in the age-group 20–29, and all of them were adenocarcinoma. All these characteristics seem, therefore, to suggest that the adenocarcinoma is a different entity from the epidermoid cancer. In 1938 Womack and I called attention to the malignant potentiality of the so-called bronchial adenoma. At first the idea was not generally accepted but now apparently there are few who doubt it. When this tumour does become malignant the arrangement of the cells is often of a pattern to suggest an adenocarcinoma. In some cases of adenocarcinoma, therefore, the cancer has probably originated in a so-called bronchial adenoma which has undergone malignant transformation.

Many of the die-hards who are unwilling to concede that there is any causal relation between cigarette-smoking and cancer of the lung base their objection on the ground that they have known people to develop lung cancer who had never been smokers. If it is realised and admitted that different varieties of the condition are separate entities with different ætiologies it becomes easier to understand that, for example, a high percentage of non-smokers may be found among the group of adenocarcinomas but a low percentage in the group of epidermoid carcinomas. Again, of course, nobody would be foolish enough to state that cigarette-smoking is the only cause of bronchogenic carcinoma. As I have mentioned, the high incidence of lung cancer in the Schneeberg and Joachimsthal miners, as well as in workers in the chromate industry, suggests that some carcinogenic substance was inhaled by the workers in those industries. Moreover, for any malignant transformation to take place, there must be a reaction of the host's cells to the carcinogenic agent. After all, in our animal experiments with cigarette tars, only 44% of the mice developed carcinoma: the other 56% did not respond to the stimulus in the same way.

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INFECTION WITH DRUG-RESISTANT TUBERCLE BACILLI

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WHEN streptomycin was given alone in pulmonary tuberculosis, the bacilli became drug-resistant in a high proportion of patients from whom positive cultures were obtained after the third month of treatment. It was found that once the bacilli from a patient had become consistently streptomycin-resistant they usually remained so indefinitely. It was often pointed out that there was a danger that such a patient might infect others with his drug-resistant organisms. Harold (1951) has collected from published reports 9 cases in which tubercle bacilli isolated before treatment were found to be streptomycin-resistant. In most a source of infection could be identified. He added 2 further cases of his own, making 11 in all. Of these cases 6 were

pulmonary tuberculosis, 2 were tuberculous pleural effusions, 2 were tuberculous meningitis, and 1 was a primary tuberculous complex in the lung. In addition Debré et al. (1951) have reported 4 cases of tuberculous meningitis in which the bacilli were streptomycin-resistant before treatment was begun.

Similar dangers presumably exist when either *p*-aminosalicylic acid (P.A.S.) or isoniazid is given alone. The emergence of isoniazid-resistant bacilli in a high proportion of cases has been established by the Medical Research Council (1953a), but isoniazid has been used for a relatively short time, and we are not aware of any reports of the transmission of resistant organisms to new cases apart from 1 accidental laboratory infection (Borgen 1953). The emergence of P.A.S.-resistant bacilli when P.A.S. is given alone has received little attention in this country, but there is no doubt that it is a real danger. When tests for P.A.S. resistance have been made, resistant tubercle bacilli have been isolated in an important proportion of cases. Fresh evidence on this subject has recently been reported and the published cases have been reviewed by Turnbull et al. (1953). So far as we know, no case of infection by P.A.S.-resistant bacilli has previously been recorded.

Material and Methods

We report here cases from which tubercle bacilli resistant to streptomycin or to P.A.S. or to both were isolated but which had never received the drug to which their bacilli were resistant. Except when otherwise stated drug-sensitivity tests were made by the methods recommended by the Medical Research Council (1953b). The figures given for streptomycin and P.A.S. sensitivities are the ratio of the drug resistance of the test organism to that of the control strain H37Rv. The minimal inhibitory drug concentrations for each strain, in μg. per ml., are given in parentheses where these are known, the test strain being the numerator in each case.

Findings

INFECTION WITH PRIMARILY STREPTOMYCIN-RESISTANT BACILLI

Case 1.—A man, aged 30, was admitted to Robroyston Hospital, Glasgow, in 1951 with bilateral pulmonary tuberculosis, which probably dated from 1947. Later he developed right sacro-iliac disease with a superficial abscess, which was aspirated on numerous occasions but provided no tubercle bacilli. Tubercle bacilli cultured from the sputum in May, 1952, had a streptomycin-resistance ratio of 8 (2/0·25 μg. per ml.) and a P.A.S.-resistance ratio of 2 (0·5/0·25 μg. per ml.) and were sensitive to 0·2 μg. per ml. of isoniazid. There was no known source of infection. The patient was treated daily with streptomycin and isoniazid for three months, with moderate improvement. Cultures were negative until September, 1952 (after two months' treatment), when the sensitivities to all three drugs were unaltered. All further cultures were negative.

The history suggested that this patient had had pulmonary tuberculosis since 1947, though no radiograph was taken at that time. Streptomycin-resistant bacilli were exceedingly rare in 1947; hence this may have been a case of superinfection by streptomycin-resistant bacilli, the source of infection being unknown.

Case 2.—A girl, aged 17, was admitted to Aintree Hospital Liverpool, in April, 1952, with four months' history of cough. Radiography showed bilateral pulmonary tuberculosis. She had received streptomycin and P.A.S. for four days before admission. Culture of the sputum showed a streptomycin-resistance ratio of 128. Tests for P.A.S. resistance were not made. The patient's mother had had open pulmonary tuberculosis since 1950 and had been treated with P.A.S. alone for two months before the patient's admission; her bacilli were sensitive to streptomycin. A sister had had pulmonary tuberculosis since 1948 and had been treated both with streptomycin alone and with P.A.S. alone at different times; tubercle bacilli grown from her sputum had a streptomycin-resistance ratio of 128. Two other sisters (twins) also had pulmonary tuberculosis, but their sputum was negative. The patient was treated with streptomycin 1 g. daily and P.A.S. 20 g. daily. Positive cultures of unaltered sensitivity were obtained one and two months after treatment began. There was moderate clinical and radiographic improvement during three months' chemotherapy but in the subsequent three months on rest in bed only she deteriorated slightly.

The patient was infected, probably by her sister, with tubercle bacilli moderately resistant to streptomycin.

Case 3.—A man, aged 26, was admitted to Aintree Hospital in April, 1952, with pulmonary tuberculosis, abnormal radiographic shadows having been present since 1947. A positive culture on admission gave a streptomycin-resistance ratio of 128 and a P.A.S.-resistance ratio of 0·5. There were two domestic contacts of the patient, neither of whom was said to have had streptomycin. The patient's wife had abdominal and pulmonary tuberculosis but had only received a month's streptomycin and P.A.S. when the patient was admitted. The patient was treated with streptomycin and P.A.S. daily for three months, with moderate clinical and radiographic improvement. Culture after the first month of treatment gave a streptomycin-resistance ratio of 128; no further positive cultures were obtained.

Since this patient was known to have had pulmonary tuberculosis in 1947 he had probably been subsequently superinfected from an unknown source with a streptomycin-resistant strain.

Case 4.—A man, aged 49, was admitted to the City Hospital, Edinburgh, in July, 1951, with chronic bilateral pulmonary tuberculosis, which had been present at least since March, 1947 (mass-radiography film). Drug sensitivities were first tested in April, 1952, when the streptomycin-resistance ratio was 8 (4/0·5 μg. per ml.) and P.A.S.-resistance ratio 16 (2/0·12 μg. per ml.); the bacilli were fully sensitive to isoniazid. The patient had been given P.A.S. alone for six months in 1949–50 but had never had streptomycin. His only son had been discovered in July, 1948, to have pulmonary tuberculosis and had died, without having received chemotherapy, in January, 1950. His wife was found to have extensive pulmonary tuberculosis in October, 1949. She received streptomycin and P.A.S. daily for forty-one days, after which P.A.S. was continued alone for five months. P.A.S. was then supplemented by streptomycin 1 g. twice weekly for a further nine months. She died four months later. Although no resistance tests were made, it seems very likely that, on the above régimes, her tubercle bacilli would have become resistant first to P.A.S. and later to streptomycin (Turnbull et al. 1953). Her husband nursed her throughout most of this illness. From April, 1952, before the sensitivity results were obtained, he was treated with streptomycin 1 g. daily and isoniazid 200 mg. daily. Twenty-five days after the start of this régime bacilli resistant to 0·2 μg. per ml. of isoniazid and with a streptomycin-resistance ratio of 64 (8/0·125 μg. per ml.) were isolated; fifty-eight days after the start the bacilli were resistant to at least 50 μg. per ml. of isoniazid. There was no clinical or radiographic response to therapy.

This patient was known to have had pulmonary tuberculosis at least since March, 1947, and was probably superinfected by his wife with streptomycin-resistant tubercle bacilli. Subsequent treatment with concurrent streptomycin and isoniazid did not prevent the emergence of isoniazid-resistant bacilli.

INFECTION WITH PRIMARILY P.A.S.-RESISTANT TUBERCLE BACILLI

Case 5.—A girl, aged 18, was admitted to Aintree Hospital in September, 1952, with bilateral pulmonary tuberculosis. She had no known domestic contacts; other patients lived in the vicinity, but none had had P.A.S. A sputum culture on admission gave a P.A.S.-resistance ratio of 64 (8/0·12 μg. per ml.). The patient was treated with P.A.S. and isoniazid daily but discharged herself before completing three months' treatment. A second culture, in December, 1952, after two months' chemotherapy gave a P.A.S.-resistance ratio of 8 (2/0·25 μg. per ml.). The culture on admission was resistant to 0·2 μg. per ml. of isoniazid, which could be regarded as within normal limits of sensitivity; after two months the bacilli were

resistant to 1 μg. per ml., probably indicating a significant rise in resistance.

The patient was infected from an unknown source with a P.A.S.-resistant strain of tubercle bacilli. By the time this was established she had been treated with daily P.A.S. and isoniazid; after two months' treatment the organisms had become slightly isoniazid-resistant.

Case 6.—A woman, aged 33, was admitted to Southfield Hospital, Edinburgh, in May, 1952, with extensive tuberculosis of the left upper lobe. She had had a left pleural effusion a year previously. There was no known source of infection. A culture on admission gave a P.A.S.-resistance ratio greater than 256 (>32/0·12 μg. per ml.) but was sensitive to streptomycin. Before this was known the patient was treated with daily streptomycin and P.A.S. The last positive culture, after two months' treatment, was still sensitive to streptomycin, but the P.A.S.-resistance ratio was at least 16 (>2/0·12 μg. per ml.). The patient subsequently made excellent progress, and laryngeal swabs were still negative a year later.

The patient was primarily infected with a P.A.S.-resistant but streptomycin-sensitive strain of tubercle bacilli. No source of infection was known. Sputum conversion took place after two months' treatment with daily streptomycin and P.A.S.

Case 7.—A boy, aged 18, with congenital pulmonary stenosis, was known to have had pulmonary tuberculosis since 1946, but had never been given P.A.S. There was no known source of infection. He was admitted to Southfield Hospital in March, 1953, with bilateral fibrotic apical tuberculosis. Tubercle bacilli cultured on admission had a P.A.S.-resistance ratio of 64 (4/0·06 μg. per ml.) but were sensitive to streptomycin and isoniazid. Before this was known, the patient was treated with isoniazid 100 mg. and P.A.S. sodium 5 g., both given twice daily. After two months' treatment two cultures within four days gave P.A.S.-resistance ratios of 4 (1/0·25 μg. per ml.) and greater than 1000 (>64/0·06 μg. per ml.). Such fluctuations are not uncommon with P.A.S. resistance. The first of these cultures was resistant to 50 μg. per ml. of isoniazid on solid medium. Two months later two further cultures remained highly resistant to isoniazid. There was some initial clinical and radiographic improvement.

As tuberculosis was known to have been present since 1947, this patient had presumably been superinfected with P.A.S.-resistant tubercle bacilli. The combination of P.A.S. with isoniazid did not prevent the emergence of isoniazid resistance.

Case 8.—A boy, aged 15, was admitted to Southfield Hospital in May, 1952, with tuberculous meningitis. There was no known source of infection. He was treated with daily intrathecal and intramuscular streptomycin, and daily P.A.S. The positive cultures obtained from the cerebrospinal fluid on admission, and after two days' treatment, had died before P.A.S. sensitivity was tested; these cultures were sensitive to 3 μg. per ml. of streptomycin on solid medium. The first culture on which P.A.S. sensitivity could be tested was obtained five days after treatment had begun; three tests on this culture gave P.A.S.-resistance ratios of 8, 32, and 32. The presence of P.A.S.-resistant tubercle bacilli within five days of the start of treatment suggested that the organisms were almost certainly resistant before treatment was begun. Seven days after the start of treatment a culture gave P.A.S.-resistance ratios of 4, 32, and 32 in three tests, and streptomycin ratios of 1 and 2 (probably sensitive). The patient died after about four months' treatment. Cultures obtained post mortem were resistant to 5 μg. per ml. of streptomycin on solid medium though sensitive to 10 μg. per ml.

This patient was almost certainly infected with P.A.S.-resistant bacilli, which also became resistant to streptomycin while under treatment with streptomycin and P.A.S.

INFECTION WITH TUBERCLE BACILLI PRIMARILY RESISTANT TO STREPTOMYCIN AND P.A.S.

Case 9.—A woman, aged 36, was referred from an antenatal clinic in Edinburgh in July, 1953. Bilateral apical tuberculosis had been found on routine radiography. There was no known source of infection. Tubercle bacilli obtained on culture of the sputum had a streptomycin-resistance ratio of 512 (128/0·25 μg. per ml.) and a P.A.S.-resistance ratio of 256 (16/0·06 μg. per ml.). She was treated with rest in bed, streptomycin, and P.A.S. for two months before the sensitivity results were known. There was some clinical improvement but no radiographic change even though the lesions were of an exudative type which would have been expected to respond to chemotherapy. No further positive culture was obtained.

This patient was apparently primarily infected with tubercle bacilli highly resistant to both streptomycin and P.A.S. There was no known source of infection.

Discussion

In the light of present knowledge the proportion of patients in whom drug-resistant bacilli emerge, and who may pass these on to other people, should be small. Several of the present patients were probably infected when the dangers of giving P.A.S. alone were not generally appreciated, and when large numbers of patients were treated in this way. Others may have been infected by patients whose bacilli had become streptomycin-resistant before methods of preventing this were known. If present knowledge is sufficiently widely applied, such tragedies should become even rarer. We wish to emphasise once more the impropriety of giving one drug alone.

Our attention has recently been drawn to the possibility that at least some strains of bovine tubercle bacilli may be relatively insensitive to P.A.S. (Djang et al. 1952). The P.A.S.-resistant bacilli recorded here were not typed, because we had no reason to suspect bovine tuberculosis; but in future it would be wise to type any tubercle bacilli which appear to be primarily P.A.S.-resistant.

The controversy about the possibility and frequency of superinfection has continued for many years. Previously it could only be proved by superinfection by bovine on human infection, or vice versa. Drug resistance provides another label for the tubercle bacillus, and in 3 of the present cases (cases 3, 4, and 7) there is a strong suspicion that the patient was superinfected with drug-resistant bacilli. In a 4th case (case 1) superinfection may have taken place, but the evidence is more doubtful.

Summary

9 cases are recorded in which drug-resistant tubercle bacilli were obtained although the patient had received no previous chemotherapy with the relevant drug. In 4 of the patients the bacilli were primarily resistant to streptomycin, in 4 to P.A.S., and in 1 to both drugs.

3, and possibly 4, of the patients were known to have had tuberculosis before the relevant drug was in general use. Their original bacilli are therefore presumed to have been drug-sensitive, and it is thought that they had been superinfected with resistant bacilli.

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ADDENDUM

Since this paper was written, 6 additional cases of infection with P.A.S.-resistant bacilli have been recorded in the Edinburgh Centre.

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PRESERVATION OF ARTERIAL GRAFTS BY FREEZE-DRYING

A SIMPLIFIED METHOD

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ARTERIAL grafts have been stored in several different ways, notably by refrigeration in a nutrient medium (Gross et al. 1949) and in the frozen state (Eastcott and Hufnagel 1950). Of these two methods we have preferred frozen storage because it has worked better in practice (Rob and Eastcott 1953). The main disadvantage of "deep-freezing" for artery banking has been the need for maintaining at all times the low temperatures necessary to avoid physical and chemical changes in the grafts. Transportation in particular has been troublesome; special containers are needed, and detailed travelling arrangements have to be made.

An alternative method of preserving proteins is to dry them from the frozen state. This method is finding increasing application in the laboratory and in commerce; plasma, antibiotics, sera, and some food-stuffs can be stored readily and for a long time at room-temperature in vacuum containers after freeze-drying. Arteries the surgeon can carry in his instrument bag or post to other parts of the world with as much ease as a glass ampoule can be prepared by this method.

At the National Naval Medical Center, Bethesda, Maryland, much has already been achieved in the experimental investigation of tissue banking by freeze-drying. Blood-vessels, skin, and bone have been stored in this way. Marrangoni and Cecchini (1951) and Strong (1954) have reported their results after using freeze-dried material in a large number of abdominal aortic homografting operations in dogs; they believe them to be better than those obtained with fresh homografts. Hufnagel (1954) reports that the same has been true in his experience with 12 freeze-dried aortic and peripheral arterial grafts in patients. We have used such arteries in 27 patients with satisfactory early results.

We describe here a simple method of freeze-drying arterial grafts, and report some experimental observations on the process.

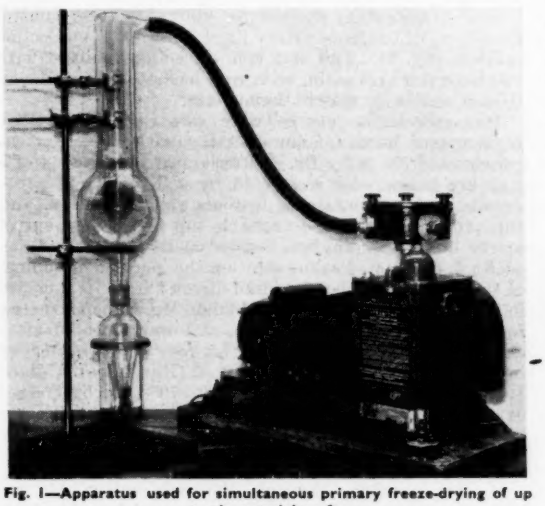


Fig. 1—Apparatus used for simultaneous primary freeze-drying of up to six arterial grafts.

Technique

PRINCIPLE

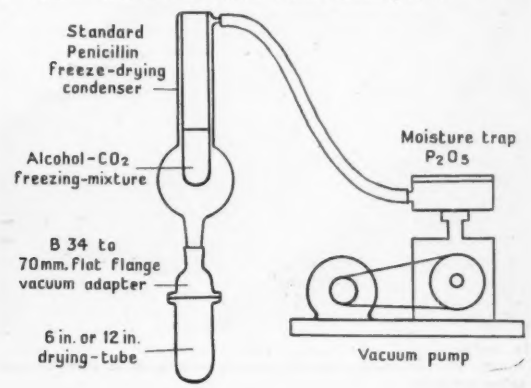
Sublimation of water vapour from the frozen state is greatly accelerated by reducing the total pressure of the surrounding atmosphere. The latent heat of vaporisation is derived from the material being dried, which is thus kept frozen. It is known that frozen solutions and suspensions must be kept below a certain temperature, which varies with the substance under examination, if separation of their constituents is to be avoided. The eutectic point of a mixed substance is the temperature above which one of its components separates out by melting; the greater part of the drying process should be done at a temperature which is below this. During freeze-drying, as the water content decreases, the temperature of the material rises towards that of its surroundings, but in other respects its composition remains constant.

METHOD

The method is based upon that used by one of us for drying purified diphtheria toxoid (Holt 1950) with much of the actual apparatus used in the early technique for small scale production.

Grafts have been dried in the 'Pyrex' test-tubes in which they had originally been frozen, at −79°C, in several instances a year before. The rubber cap was in each case removed, and a piece of sterile gauze was secured in its place with a rubber band (to serve as a bacteriological filter when air was later readmitted to the system). The graft tubes were next placed in a glass container, attached by a standard vacuum fitting to a 2·5 or 3·0 litre glass condenser[1] (fig. 1), whose inner surface was kept at −79°C with a mixture of alcohol and solid carbon dioxide. The condenser outlet was connected by a length of $^1/_2$-in.-bore rubber pressure tubing to a single-stage rotary vacuum pump.[2] A secondary moisture trap containing phosphorus pentoxide was inserted between the vacuum line and the pump to prevent any remaining water vapour from entering it. The system was found with a Pirani gauge to operate at 0·030–0·060 mm. Hg during drying. With either pump a hard note was reached in a minute or less.

1. Edwards 'Speedivac 1A' (pumping capacity 39 litres a minute) and 'IS.150' (144 litres a minute) were both used and proved completely satisfactory.
2. Penicillin freeze-drier: National Glass Industry Ltd.


Standard Penicillin freeze-drying condenser
Alcohol-CO2 freezing-mixture
B 34 to 70mm. flat flange vacuum adapter
6 in. or 12 in. drying-tube
Moisture trap P2O5
Vacuum pump

Primary drying.—Under these conditions it was possible to complete the primary drying of 1–6 assorted arteries during a working day. The grafts became slightly shrunken, hard, and pinkish white, and fell free from the wall of their containers, which on removal were found to be no more than cool to the touch. A few loose fragments of dried plasma were often present. Ice accumulated on the condensing surface was recovered next morning as water and was measured.

Secondary drying.—Much of the remaining moisture was extracted by placing the grafts, still in their gauze-capped tubes, in a vacuum desiccator over fresh phosphorus pentoxide. This container was evacuated by the pump for at least twenty minutes, and the vacuum was maintained for three days or more; except with large batches, little visible change developed in the phosphorus pentoxide during this time.

Final sealing.—Close-fitting rubber caps,[3] autoclaved and vacuum-desiccated, were applied to the tubes, whose gauze filters were taken off on removal from the desiccator. A sterile hypodermic needle attached to the vacuum line was next inserted through each cap in turn, and the air was thus extracted until no further increase in the vacuum obtained could be detected by the high-frequency spark tester or by the note of the pump. The needle was next quickly withdrawn, and the cap covered in melted black 'Picien' vacuum wax. In very few instances has this seal failed. Tubes have been periodically examined with the spark tester and a final check made just before each graft was reconstituted for use.

Reconstitution.—Sterile isotonic saline solution was injected through the rubber cap until the tube was full; no air was admitted until the artery had regained its normal appearance from twenty to thirty minutes later; it was then inserted into the patient or was used for the tests described below.

3. Baird & Tatlock Ltd. Ref. no. ZSD 4158. Suba Seal Ltd. Ref. no. 867278.

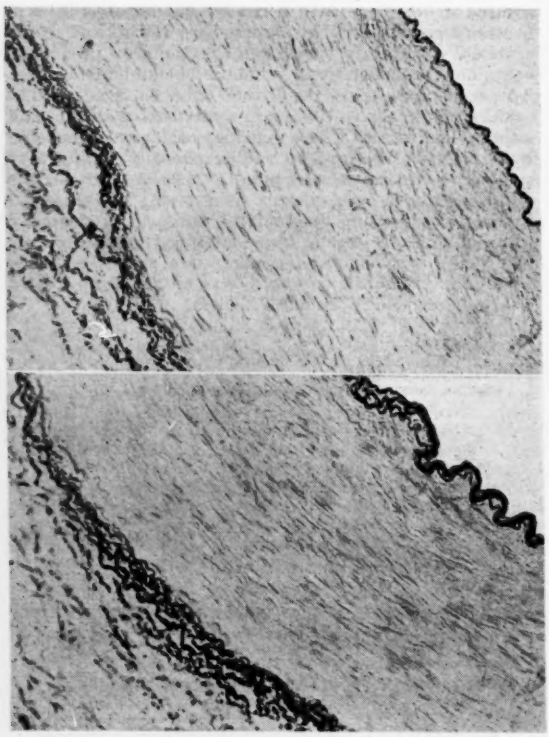


Fig. 2—Histological appearance of same arterial graft: upper, fresh; lower, after freeze-drying and reconstitution in vacuo with isotonic saline solution.

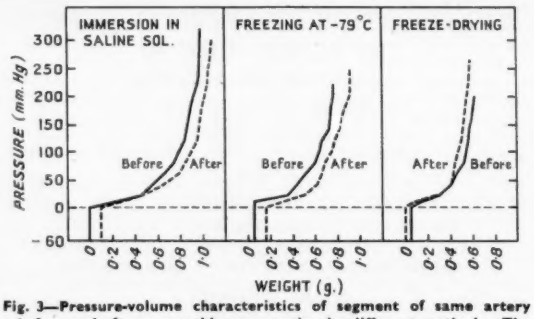


Fig. 3—Pressure-volume characteristics of segment of same artery before and after a month's preservation by different methods. The increase in weight in g. is numerically equal to the increase in volume of the graft in ml. of injected isotonic saline solution.

Experimental Observations

Bulk of Material to be Dried

An arterial tree, including the thoracic and abdominal aorta, the iliac, femoral, and popliteal arteries, and short lengths of their branches, weighed 67 g. With a large wide-necked drying tube of the type shown in fig. 1 most of the grafts prepared from such a specimen could be dried in one batch.

Examination of Condensate

Primary drying of the arteries mentioned above yielded a layer of ice on the condenser from which 37 g. of water was later recovered. This is more than the amount of water which it is practicable to remove with phosphorus pentoxide alone. For amounts greater than 15 g. a refrigerated condenser is more satisfactory but, unless mechanically chilled, needs closer attention.

Chemical analy is of the condensate showed a chloride content of 3 m.eq. per litre or less; no sodium or potassium could be detected by flame photometry. Some specimens of condensate were clear, others faintly opalescent. These were found to show a similar fluorescence on exposure to ultraviolet light to that obtained with vacuum grease.

Characteristics of Grafts after Reconstitution

Grafts reconstituted *in vacuo* with isotonic saline solution presented a normal fresh appearance. Histological examination showed no difference from control specimens of the same artery fixed in formalin and saline solution (fig. 2). This was true of sections stained with hæmatoxylin and eosin, with iron hæmatoxylin and van Gieson, and with elastic tissue stain.

Pressure-volume curves were constructed for three segments of human femoral artery with an apparatus constructed for us by Dr. S. Rowlands. It consisted of a mercury manometer connected by a T tap to a hypodermic syringe containing isotonic saline solution, and through a second and detachable tap to the segment of artery under examination, ligated at its free end. With each ml. of injected saline solution the increase in volume of the artery could be measured directly from its increase in weight. A curve from 0 to 250 mm. Hg was constructed for each of the three segments, and was repeated after each piece had been preserved for four weeks either by immersion in nutrient saline solution (Hanks and Wallace 1949) at 0°–4°C, or by freezing at −79°C, or by freeze-drying by the method described. The results are shown in fig. 3.

Effect of Varying Conditions of Drying

It was possible, through the coöperation of the Edwards Company, to subject three equal lengths of an

external iliac artery to the following treatment. After freezing by immersion in small capped bijou bottles in alcohol-carbon dioxide freezing-mixture at −79°C, one length of artery was dried for forty-seven hours without external cooling, the second length for six days at −30°C, and the third for fourteen days at −50°C. Each piece was then examined for residual moisture content, by the following method:

Moisture determinations.—The remaining water content of these and the other grafts examined in this investigation was extracted by a further process of freeze-drying in a micro-unit at Pirani pressures of about 0·015 mm. Hg. The vapour evolved was trapped in a narrow-bore glass U-tube immersed in alcohol and carbon dioxide at −79°C, and in equilibrium with an oil manometer in parallel with the vacuum line. The amount of ice thus condensed was next measured by closing a tap between the two limbs of the manometer and removing the cold trap, so that the ice revaporised. Its pressure thus measured was converted into terms of weight by the manometer scale, which was calibrated in units of 0·00001 g. H_2O. When no more water could be extracted in this way, the now totally dry specimen was quickly weighed. The percentage residual moisture content could then be calculated.

TABLE I—EFFECT OF TEMPERATURE VARIATION ON DRYING OF ARTERIAL GRAFTS

Temperature of drying-chamber (°C)	Time of drying	Residual moisture content by final dry weight (%)	Estimated amount of original tissue water removed (%)
20	47 hr.	0·83	99·9
−30	6 days	9·32	96·5
−50	14 days	100—i.e., processed specimen still contained a weight of water equal to its final dry weight	65·5

Results obtained by this method confirm that arterial tissue dries rapidly at room-temperature, but below 0°C drying-rates become progressively slower as the temperature falls (table I). Samples taken during primary drying with a thermocouple in the wall of the artery were also examined for moisture content at known temperatures in this cycle. The results of these observations are shown in table II. The final moisture content of other arteries after secondary drying for seven days over phosphorus pent-oxide in a vacuum desiccator was found to be 2%; the transfer from desiccator to micro-drier necessarily involved a short exposure to atmospheric water vapour. This condition, however, is reproduced in the process of final sealing of grafts by the method described.

Thermometry during Freezing and Drying

The temperature of the tissue during freezing has an important bearing on its chance of physicochemical preservation, and during drying it indicates the stage which drying has reached. We have therefore recorded the temperature changes within the wall of several grafts throughout the cycle, using a very fine gauge thermocouple to reduce the error from conducted external heat. This confirmed what had been found by simple thermometry: freezing in an alcohol-CO_2 mixture at −79°C in an air-containing glass tube though not slow is not rapid either. A 2·5 cm. length of carotid artery, weighing 0·5 g., equilibrated with its surroundings at −58°C in five minutes, whereas a 5 cm. length of aorta, weighing 14 g., took fifteen minutes.

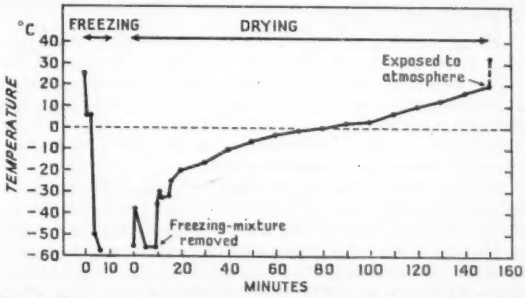


Fig. 4—Thermocouple readings during freezing and freeze-drying of a femoral artery segment 2·5 cm. long. The peaks at the beginning and end of the primary drying cycle correspond respectively to the evacuation of the system and to the exposure of the graft to room air.

The same specimens were next subjected to rapid evacuation in the apparatus described, the thermocouple leads having been brought out through brass electrodes fitted into standard B.14 vacuum sockets. The results, indicated in fig. 4, prove that already frozen artery tissue placed in the drying-chamber at a low temperature and quickly decompressed can be relied on to remain frozen by virtue of the rapid evaporation of water vapour alone. No external cooling need be used; in fact such cooling has already been shown to slow the rate of drying. Experiments of this kind also confirmed that a moderately large batch of arteries—e.g., the whole yield from one donor—can be taken through the stage of primary drying in about ten hours.

TABLE II—MOISTURE REMOVED FROM AND REMAINING IN ARTERIAL SEGMENTS AT VARIOUS STAGES IN DRYING PROCESS

Stage of drying in chamber at 20°C ± 2°C	Residual moisture content by final dry weight (%)	Estimated amount of original tissue water removed (%)
Specimen at −6°C in primary drying cycle	51·0	86·8
Specimen at 0°C in primary drying cycle	19·5	93·0
On reaching 20°C (end of primary drying)	4·4 5·1 5·3 } 3 specimens examined	99·2
After seven days' drying at 20°C	2·2 2·3 2·0 } 3 specimens examined	99·3

TABLE III—QUANTITATIVE EFFECT OF FREEZING AND FREEZE-DRYING ON BACTERIAL CONTAMINATION OF ARTERIAL GRAFTS

Control culture	Added bacteria	Method of processing graft	Result
10 segments taken aseptically; 7 lightly contaminated with *Staph. albus* (donor with type-II nephritis)	$11·8 \times 10^6$ viable coliforms between 10 segments	Freeze-dried	Average per segment 340 organisms
10 segments; 7 contaminated with spore bearers (donor with pelvic peritonitis)	$8·5 \times 10^6$ viable coliforms between 19 segments	10 Frozen and thawed	3×10^6 organisms
		9 Freeze-dried	7/9 sterile 1 segment 100 organisms 1 segment 1200 organisms
10 segments taken aseptically; 2 contaminated with *Esch. coli* (donor with carcinoma of colon)	75×10^4 *Staph. aureus* between 20 segments	10 Frozen and thawed	$20·3 \times 10^6$ organisms
		10 Freeze-dried	$2·1 \times 10^6$ organisms

Bacteriological Studies

Many bacteria survive freezing and thawing, and some also resist prolonged desiccation. Freeze-drying is one of the accepted methods of preserving bacterial cultures. If the moisture content of a dried culture is very low, and storage is prolonged, there is a progressive loss of viable organisms; in fact, measures must be taken to protect them (Proom and Hemmons 1949).

We therefore studied the effect of freeze-drying on a known bacterial contamination of human arterial grafts. Some arteries were taken aseptically, and others contaminated deliberately with known quantities of bacteria. Control cultures were obtained, and were later repeated on equal numbers of contaminated arterial segments after freezing and thawing, and after freeze-drying and reconstituting. The effects of these procedures on measured numbers of viable coliform bacilli and staphylococci are shown in table III.

These results indicate that the freeze-drying of arterial grafts by this process is an effective means of reducing bacterial contamination. But the grafts remain infected; therefore the need for careful selection of donors and an aseptic graft-taking technique still remains.

Discussion

This method of freeze-drying, though simple, yields a product which, after reconstitution, retains most of the properties of fresh material, judged by its physical and morphological characteristics. When it is applied to other substances—e.g., penicillin and purified diphtheria toxoid—which are assayable, good chemical preservation can be demonstrated.

Tissue is usually dried for histological purposes at −40°C or less. This is necessary if certain minute structural changes are to be avoided; but such drying takes much longer (table I). Complicated apparatus is needed to maintain the refrigeration of the drying-chamber and of the condenser during this long time, particularly if fairly large amounts of tissue are being dried.

One objection to drying with the chamber at room-temperature is the possibility of changes due to eutectic separation of water and other constituents. Table II, however, shows that, as the drying temperature rises, the water content rapidly falls, with the result that at −6°C about 87% of the original water has already been removed. It is therefore unlikely that the relatively small amount of water remaining will disturb the structure of the arterial segment, and the histological appearance of the reconstituted artery confirms that by this standard the method has been satisfactory.

It is important to select donors of arterial grafts for freeze-drying with particular care. Even early evidence of intimal or medial changes preclude the use of this method, since lipoid material cannot be dried, and early changes in the tissue-proteins may lead to further denaturation during drying. We therefore apply stricter criteria to the selection of donors when the vessels are to be freeze-dried than when they are to be banked frozen.

Summary

A simple method of preserving arteries by freeze-drying is described.

Such arteries can be stored at room-temperature for an indefinite time.

In clinical practice freeze-dried transplants of large arteries have given results which in the early stage equal those of arteries preserved by other means.

We wish to thank Dr. R. D. Andrews, of the Wright-Fleming Institute, and Dr. G. W. D. Scott, of the department of morbid anatomy, St. Mary's Hospital, for their help with the bacteriological and histological studies respectively; and Dr. P. N. Cardew, of the department of medical photography, St. Mary's Hospital Medical School, for the photographs.

References at foot of next column

THE FATE OF BISMUTH CARBONATE IN THE STOMACH

A RADIOLOGICAL STUDY

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THE therapeutic value of an alkali in the treatment of peptic ulceration appears to depend on at least six factors: chemical efficiency of the alkali; the absence of any after-secretion effect; the persistence of the alkali in the stomach under varying conditions; any protective effect it may have by adhering to the gastric mucosa, thus providing neutralisation of hydrochloric acid as it is secreted; any physical or chemical protective effect that it may have by persisting in the crater of an ulcer; and the absence of undesirable side-effects. With radio-opaque alkalis radiological methods can be used to examine with some degree of accuracy three of these factors—namely, the persistence of the alkali in the stomach, any adherence to the gastric mucosa, and the persistence in the crater of an ulcer.

There has been of late revived interest in the use of bismuth carbonate in the treatment of peptic ulcer, and Kemp (1950), Croxon Deller (1952), Douthwaite (1953), and Avery (1953) have reported favourably. Hence it seemed worth while to study the fate of this alkali when it was given in therapeutic dosage under different conditions to healthy people and to patients with either gastric or duodenal ulcer. Special attention was directed to its persistence in the stomach, its adherence to the gastric mucosa, and its retention in the ulcer crater in patients with recently proved radiological evidence of peptic ulcer.

The dose of bismuth carbonate used for the test-meals was 20 g. This dose is within the therapeutic range and is the alkali equivalent of about a third of the normal 24-hour secretion of hydrochloric acid. It was given in the form of a cream by whisking the bismuth carbonate powder in 2 oz. of water for a minute or so in a high-speed electric mixer. The cream could be swallowed easily from a medicine-glass, and any remaining in the glass was scraped out with a spoon.

Methods

It was decided to make each test examination on four persons, but in one of the groups of normal subjects five were included, and one patient in one of the gastric-ulcer groups also had a duodenal ulcer and therefore also appeared as a fifth patient in one of the duodenal-ulcer groups. The people examined were unselected. Two of the normal subjects (women) were used twice for different examinations after a fortnight's interval. None of the patients with peptic ulcer appear twice in the series, except the male with a double lesion. The normal subjects and the patients were examined fasting.

Tests

The tests made on normal persons were as follows:

(1) Bismuth carbonate 20 g. was given in 2 oz. of water, the subject being prepared as for a barium-meal examination.

MR. EASTCOTT AND OTHERS: REFERENCES

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(2) As in (1), but a few minutes after the bismuth had been given 6 oz. of water was drunk, and observation was continued.

(3) The bismuth carbonate was given on an empty stomach and followed by one egg beaten up in milk to a total volume of 6 oz.

(4) The bismuth carbonate was followed by an ordinary mixed meal.

(5) An ordinary mixed meal was given to the fasting subject, and then the bismuth carbonate was given.

(6) A mixture of 20 g. of bismuth carbonate in 6 oz. of milk was given.

The tests made on patients with gastric ulcer were identical with those enumerated above, except that test 2 was omitted. The tests made on patients with duodenal ulcer were limited to tests 4 and 5.

Radiological Examination

The gastric emptying-rate of bismuth carbonate, the adherence of bismuth carbonate to the gastric mucosa, and the persistence of bismuth carbonate in an ulcer crater were all likely to be affected considerably by the position adopted by the patient during the test and by the use of abdominal palpation. Accordingly it was decided to adopt the erect position throughout the examination, except for two normal subjects in test 1 and one normal subject in test 2, who were deliberately examined prone, the films being taken in that position. The patient or subject sat in a chair during the intervals between individual radiographic examinations. Abdominal palpation was deliberately avoided. The radiographic examinations were made rigidly to the time schedule previously arranged at fixed intervals of up to an hour after the start of the test. It was thought that the erect and sitting positions adopted throughout the test corresponded most nearly to those of a patient receiving ambulatory treatment for peptic ulcer. The erect position had the additional advantage that it facilitated estimation of the quantity of bismuth carbonate remaining in the stomach at the end of a given time.

At every stage of each investigation an attempt was made to assay the distribution and quantity of the remaining bismuth carbonate in the stomach, the presence of coating of the gastric rugæ, and the retention of bismuth carbonate in the crater of a gastric or duodenal ulcer.

Results

Normals

In the normal subjects there was a wide variation in the degree of retention of bismuth carbonate in all the tests except test 6 (bismuth-carbonate and milk mixture), in which nearly all the bismuth carbonate was retained in each of the five people at the end of an hour. Coating of the gastric rugæ was seen in those given bismuth carbonate only, in those who were later given water after their bismuth, and in three of the four people given a meal followed by bismuth, but in this last group the coating was slight. Flocculation took place in all the other tests except test 6, in which curds and not fine fragments were observed.

Gastric Ulcer

In the patients with gastric ulcer there was a lack of uniformity in all the tests in the rate of emptying of the stomach, and even test 6 showed considerable variation. Maximum retention took place in test 3, in which a mixture of egg and milk was given after the bismuth. Coating of the gastric mucosa was seen after a dose of bismuth carbonate given to the fasting patient, but did not persist for an hour in any of the four patients tested; it was infrequent in the other tests. Coating of the mucosa was only seen to persist for an hour in one of the twenty patients with gastric ulcer examined in the five different tests. Flocculation was present in every test except test 1, in which bismuth carbonate was given alone; temporary coating was observed in this test. In fourteen of the twenty patients the ulcer crater was recognisable an hour after the test had begun, owing to the bismuth carbonate retained in it, but the amount of bismuth retained in the crater was no more than a trace in seven of these patients.

Duodenal Ulcer

In the patients with duodenal ulcer there was again a lack of uniformity in the rate of disappearance of bismuth carbonate from the stomach. The bismuth was usually retained longer in the stomach in patients given the bismuth after a meal of food than in patients given bismuth on an empty stomach. Flocculation rather than true coating of the stomach was present under the conditions of experiment. In only two of the nine patients examined was the duodenal ulcer crater recognisable an hour after the start of the test.

Conclusions

From these results it is evident that the retention of a significant quantity of a 20 g. dose of bismuth carbonate varies greatly from person to person under the same conditions. In a healthy person the retention is greatest when the bismuth is given in a milk mixture. True coating of the gastric rugæ persists only to a significant extent when bismuth carbonate is given as a suspension on an empty stomach, but it may occur to a slight extent in other circumstances. Flocculation of bismuth in the stomach is more common than coating.

Ten of the twenty patients with gastric ulcer retained half or more of the bismuth in the stomach under various conditions of test for an hour, but the emptying-rate was not uniform. Coating of the rugæ was exceptional at the end of an hour. Bismuth was retained in the ulcer crater in nearly three of every four patients, but in only one of every four was this retention considerable.

In patients with duodenal ulcer the rate of disappearance of bismuth carbonate from the stomach was more rapid than in gastric-ulcer patients. In the small number tested only three of the nine had half or more of the bismuth remaining in the stomach at the end of an hour. Flocculation of bismuth and not coating of the gastric mucosa took place in every patient in the two tests after half an hour. Retention of bismuth carbonate in the ulcer crater was uncommon.

It is evident that the effectiveness of bismuth carbonate as an alkali given in large dose at infrequent intervals is likely to vary considerably from patient to patient as well as with the circumstances of administration. It seems that, when the bismuth is given in milk or is followed by egg and milk, its retention in the stomach will be maximal. There is also some evidence in favour of giving it after a meal rather than before. It is clear that any protective effect exerted by direct contact with an ulcer surface is likely to be small.

Summary

Experiments are described in which radiography was used to examine the retention of bismuth carbonate in the stomach, its adherence to the gastric mucosa, and its retention in peptic ulcers.

Ten of twenty patients with gastric ulcer retained half the test dose of 20 g. of bismuth carbonate in the stomach for an hour irrespective of the method of administration. Three of nine patients with duodenal ulcer retained half the test dose for an hour.

Persistent coating of the gastric mucosa for an hour occurred only once in twenty patients with gastric ulcer, and did not occur in nine with duodenal ulcer, and is thus unlikely to be an important factor in the effectiveness of the alkali.

The ulcer crater was persistently outlined by small amounts of bismuth carbonate in fourteen of twenty patients with gastric ulcer, and two of nine with duodenal ulcer.

There is evidence in favour of combining bismuth and milk as a mixture or following it with egg and milk to prolong the retention of the alkali in the stomach. In duodenal-ulcer patients retention in the stomach is also more likely if the alkali is given after a meal.

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BOVINE ANTIHÆMOPHILIC GLOBULIN IN THE TREATMENT OF HÆMOPHILIA

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THE rational treatment of hæmophilia aims at raising the blood level of antihæmophilic globulin (A.H.G.) to the point at which coagulation can become hæmostatically effective. This is usually attempted by transfusing blood or plasma or by injecting a concentrated preparation of A.H.G. In practice, therapy is hampered by uncertainty about the activity of available preparations, the minimal blood-level required, and the duration of any increase produced. All these troubles can be traced to the difficulty of measuring A.H.G. activity. Assay methods used hitherto determine A.H.G. activity from the amount of material required to correct the clotting-time, prothrombin consumption, or thrombin generation (Pitney and Dacie 1953) of hæmophilic blood. They thus depend on a supply of hæmophilic blood; and, since this is seldom continuously available in the laboratory, the tests which could be made were limited. For this reason there have been relatively few observations on the blood-levels of A.H.G. which might indicate the physiological minimum, apart from those of Brinkhous et al. (1954) who used hæmophilic dog blood. Experimental work on the purification of A.H.G. has also been greatly restricted, since at every stage the activity of the product should be tested if systematic progress is to be made.

The thromboplastin-generation test, introduced by Biggs and Douglas (1953), has removed these restrictions since it can be modified to assay A.H.G. and requires only constituents derived from normal blood. This application, which will be published later, has allowed many measurements of blood-A.H.G. levels to be made. From these findings and those of Brinkhous et al. (1954), Pitney and Dacie (1953), Graham et al. (1953), and Baserga and de Nicola (1951) it can be deduced that 30–50% of the normal amount of A.H.G. in the blood is needed for reasonable hæmostatic efficiency. Usual estimates of the therapeutic level are much lower than these (Wright et al. 1948) because restoration of the clotting-time to normal is often taken as the criterion, and 2–5% of the normal amount of A.H.G. in the blood is probably sufficient for this in most hæmophilic patients. In cases in which dosage has been controlled by determining the clotting-time the real therapeutic levels of A.H.G. have seldom been reached, and the patients have often continued to bleed. It follows that the proper treatment of a hæmorrhagic episode and the prevention of bleeding after a minor operation will involve the use of much larger amounts of blood or of A.H.G. than are usually given.

In view of the limited supply of human blood we decided to investigate the possibility of using A.H.G. derived from animals. Patek and Taylor (1937) showed that plasma fractions active in correcting the clotting time of hæmophilic blood could be obtained from the blood of the sheep, ox, rabbit, and monkey. Pohle and Taylor (1938) used an ox-blood plasma fraction as a local hæmostatic to control hæmophilic bleeding. Spaet and Kinsell (1953) produced a bovine A.H.G. preparation by a method based on the Cohn process but did not use it clinically. Lorand and Laki (1954) have prepared material with A.H.G. activity from dog and ox blood by adsorption on to kaolin. Our own work has also been mainly concerned with ox blood, which is available in large quantities from the slaughter-house, and which we found to have an average A.H.G. activity sixteen times that of human blood. Pig, horse, and sheep blood have been investigated but are less active.

Many experiments were made to improve methods for extracting and purifying bovine A.H.G., the results being checked by frequent assays of activity. The best material has been produced by salt fractionation, and, though losses have been unaccountably variable, enough bovine A.H.G. has been prepared to allow a study of its effects on animals, and a trial in man. Details of the method of preparation will be published in another paper. The material has an activity equivalent to about 20 pints of normal blood per g. of protein; it is far from "pure," containing a large proportion of fibrinogen. It maintains its activity indefinitely in the dried state, but quickly deteriorates in solution. When the publications by Spaet and Kinsell (1953) and Lorand and Laki (1954) appeared, the methods described by them were used in parallel with our own but were found to yield less active material.

Before bovine A.H.G. was used clinically certain investigations were necessary. The assay of activity, which had been based on the thromboplastin-generation test, was confirmed by finding the expected ability to correct the prothrombin consumption and thrombin generation of hæmophilic blood in vitro. Sterilisation of the A.H.G. in solution presented some difficulty, since it was heat-labile, lost activity on Seitz or Berkfeld filtration, and could not be passed through a gradocol membrane. Sterilisation was finally achieved by centrifuging at high speed, followed by measured exposure to ultraviolet light, the solution being contained in a rotating quartz tube. Toxicity was investigated by injecting the material into mice and rabbits. The mice each received an intraperitoneal injection of about 100 times the human dose in proportion to body-weight. 30 mice survived without obvious ill effects, but a batch of 5 died, about two weeks after injection, with kidney lesions indicating nephrosis, these 5 animals having received material which had been denatured and partially coagulated by accidental overexposure to ultraviolet light. One rabbit received 1 g. of material by intravenous injection in three doses in six weeks and showed no ill effects.

The clinical action of the material was next studied in three hæmophilic volunteers. The results were judged

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by the effect on clotting after intravenous injection and by the amount of hæmorrhage after dental extraction. Since an obvious disadvantage of the use of animal protein is the development of antibodies, tests for their presence were made on all three volunteers.

Methods

The *clotting-time* was measured by a modification of the Lee and White method (Biggs and Macfarlane 1953), the normal range being 3–10 minutes. The *prothrombin-consumption index* was measured by the method of Merskey (1950), the normal range being 0–40%. *A.H.G. activity* was measured by a modification of the thromboplastin-generation test of Biggs and Douglas (1953), which will be published later. *Platelet-agglutination* tests were made on a mixture of the test material and human citrated blood incubated for ten minutes and then hæmolysed with ammonium oxalate and observed in a counting-chamber by phase-contrast microscopy.

Results of Clinical Trial

All three patients were admitted to the Radcliffe Infirmary under the care of Dr. P. C. Mallam.

Case 1 (Reg. no. 32036).—A man, aged 43, with the family and personal history typical of hæmophilia, had spent much of his life in hospital with hæmaturia, hæmatemesis, hæmarthroses, and hæmorrhage in the deep tissues requiring many transfusions. Previous dental extractions had led to prolonged hæmorrhage and required the transfusion of 42 pints of blood in all, but on one occasion there was only slight bleeding and no transfusion was needed.

Trial.—At the beginning of the trial a skin test was made with bovine A.H.G., which gave no reaction. A small intravenous dose of the material was next given with no observable ill effect. Next day A.H.G. 0·5 g. was injected intravenously, producing no untoward reaction apart from a transient sensation of tingling of the lips. A general anæsthetic was given thirty minutes later, and the stump of a carious molar tooth was removed by Mr. C. Annand Smith, and the socket was scraped. There was very little bleeding at operation, and this stopped within a few minutes, the socket becoming filled with firm clot. At seven hours after the extraction there had been no bleeding, and a further dose of A.H.G. (0·8 g.) was injected. The socket healed completely within ten days without hæmorrhage.

Laboratory findings.—Before treatment the patient's clotting-time was 12–15 minutes and prothrombin-consumption index 70–120%. The blood-A.H.G. level was less than 1%. After the first injection the A.H.G. level rose to 35%. Seventeen hours after the second injection it had fallen to 5%, but the clotting-time and prothrombin consumption remained normal. By next day, forty-three hours after the last injection, the clotting-time and prothrombin consumption had reverted to the untreated levels.

Case 2 (Reg. no. 188647).—A man, aged 38, had the typical history of hæmophilia. Three brothers are also affected. He had been in hospital many times with hæmaturia, hæmarthroses, and melæna, requiring many transfusions. One tooth had been removed previously, after which he had bled for fourteen days but did not require transfusion.

Trial.—An intradermal skin test with bovine A.H.G. gave no reaction. Next day A.H.G. 0·4 g. was given intravenously, and thirty minutes later a general anæsthetic was given and a carious premolar tooth was removed by Mr. C. Annand Smith, and the socket was scraped. There was little bleeding at the time of extraction, and the socket was dry and filled by a clot within about thirty minutes. A second dose of A.H.G. (0·5 g.) was given eight hours after the extraction, and a third (0·5 g.) twenty-six hours after the second. During each injection the patient experienced "specks and flashes of light" in the eyes but no other sensations and no constitutional disturbance. There was no bleeding until four days after the last injection, when there was slight oozing around the clot, which stopped spontaneously in a few minutes. Two days later the clot became detached and the socket was found to have healed beneath it.

Laboratory findings.—Before admission this patient had been investigated by Dr. J. V. Dacie, of the Postgraduate Medical School, London. Some of the laboratory investigations made during the trial are summarised in fig. 1. Before treatment the clotting-time was 26–35 minutes, and the prothrombin-consumption index 160%. After the injections the clotting-time was maintained within the normal range until twenty hours after the last injection. The blood-A.H.G. level was maintained for only a relatively short time after the injections, having fallen to 5% of normal within seven hours, and to 2% after twenty hours. The prothrombin consumption fell to 21% after the first injection, but after the third it unexpectedly rose slightly instead of falling, although the blood-A.H.G. level had risen.

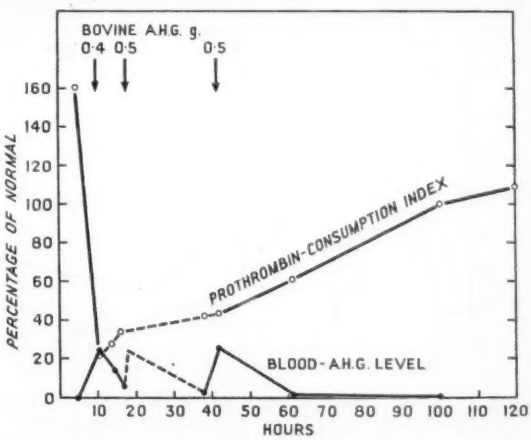

Fig. 1—Changes in A.H.G. level and in prothrombin-consumption index, expressed as percentage of normal, during treatment of case 2 with bovine A.H.G. Interrupted line indicates probable changes after second injection of A.H.G., no readings having been made in this period.

Case 3 (Reg. no. 189223).—A hæmophilic, aged 34, with four affected brothers and one affected nephew, had been admitted to hospital many times with hæmarthroses and required transfusions on losing his primary teeth. At the age of 23 he had sixteen teeth removed in one operation and bled for six weeks, requiring the transfusion of some 40 pints of blood. At the age of 26 he had a transient left hemiplegia, and later one epileptic attack. Since this time he has been treated with 'Epanutin' and phenobarbitone. On admission for the trial he was most anxious to have all his remaining sixteen teeth removed, since many of them were grossly carious and causing trouble. With some reluctance it was agreed to comply with his wishes.

Trial.—An intradermal skin test made with bovine A.H.G. was negative. Next day the volunteer was given A.H.G. 0·4 g., and fifteen minutes later the sixteen teeth were removed under general anæsthesia by Mr. J. M. Helsby. Bleeding was not excessive at operation, but throughout the day there was persistent oozing from all tooth sockets despite two further injections of A.H.G. totalling 0·8 g. In the evening dental splints lined with alginate soaked in 'Stypven' (Russell's-viper venom) were fitted, and the bleeding stopped. During the next three days there was no bleeding and three injections of A.H.G. were given totalling 1·3 g. At each injection the patient experienced "light-flashes" in front of his eyes. Treatment with A.H.G. was then stopped because severe thrombocytopenia was discovered at this time. On the fourth day after extraction the dental plates were removed, and the sockets were found to be dry and to be filled with firm clots. Throughout the following two days there was no bleeding. On the sixth day after extraction (three days after the last injection) slight oozing started first from one and then from several sockets. This was readily controlled by light pressure and Russell's-viper venom. It recurred, however, from time to time for a further seven days but was always controllable, and transfusion was not considered necessary, though the Hb level fell to about 50%. The sockets healed within fourteen days but in the next three weeks developed several blood-filled overgrowths of granulation tissue which required excision, the operation being covered

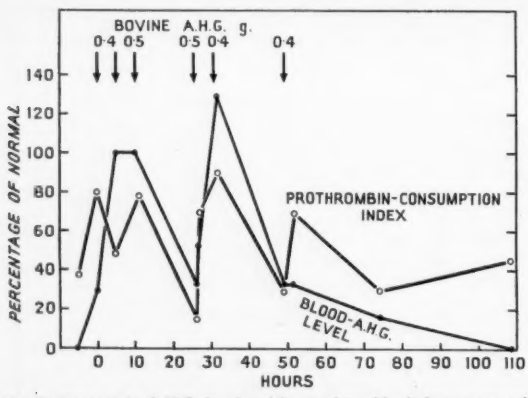

Fig. 2—Changes in A.H.G. level and in prothrombin index expressed as percentage of normal, during treatment with bovine A.H.G.

by the transfusion of 3 pints of fresh blood and $7^1/_2$ pints of fresh plasma. These superficial blood-cysts may possibly have been related to the effects of epanutin.

Laboratory findings.—This patient had been previously investigated by Dr. E. K. Blackburn, of the Royal Infirmary, Sheffield. Some of the findings obtained during the trial are summarised in fig. 2. Before treatment was started, the clotting-time was 13 minutes and the prothrombin-consumption index 37%. The clotting-time decreased to normal after the first injection and remained within normal limits for five days. The results of the prothrombin-consumption tests were both unexpected and disturbing (fig. 2), since after each injection of A.H.G. the index rose above its pre-injection level. This rise was inexplicable until it was discovered, after the fifth injection, that the patient's blood contained no platelets. During the night which followed this injection the platelets increased to 33,000 per c.mm., and after the sixth and final injection they decreased again almost to zero. Since the decrease in the platelet-count appeared to be directly related to the injection of A.H.G., treatment with this material was then stopped. After the last injection the platelet-count increased by an average of 22,000 per c.mm. a day until it reached the normal range. During the period of thrombocytopenia there were no hæmorrhagic manifestations of the purpuric type, and the bleeding-time determined by needle punctures in the ear lobe was normal. Another feature of this case was the fact that the blood-A.H.G. level was kept higher than in either of the two other patients.

Other Investigations

Antibodies

In each patient tests for the presence of antibodies were made at three and six weeks after the dental extractions. Incubation of the patient's plasma with bovine A.H.G. caused no loss of the activity of A.H.G., suggesting that specific antibodies to A.H.G. had not developed to any significant extent. Intradermal skin tests gave very slight positive reactions in cases 1 and 2 and negative reactions in case 3. Precipitin reactions, done by Dr. A. C. Allison, gave weakly positive reactions between the patients' sera and A.H.G. dilutions in all three cases.

Platelet Agglutinins

Bovine A.H.G. agglutinated human platelets but had no effect either on human red cells or on rabbit platelets. Platelets were agglutinated by concentrations as low as 0·125 mg. of protein preparation per ml. of blood; hence the injection of 0·5 g. of A.H.G. would allow an agglutinating concentration to be reached in vivo. The platelet agglutinin was also present in the ox plasma. When re-examined some weeks after their injections the platelet-counts of cases 1 and 2 were normal.

Effect of Oral A.H.G.

Ten days after dental extraction case 2 ate 2 g. A.H.G. in powder form mixed with cereal. Clotting-times and blood-A.H.G. levels estimated at intervals during the following twenty-four hours indicated that no active material had been absorbed into the blood-stream.

Discussion

The principal reason for using an animal source of A.H.G. was the realisation that supplies of human blood must be inadequate for the effective treatment of hæmophilia. A hæmophilic adult probably requires the administration of an amount of A.H.G. contained in 5 pints of blood to achieve temporary hæmostatic normality, and studies of the survival of both human and bovine A.H.G. in hæmophilic blood indicate that this dose must be repeated daily to maintain the effect. Even if this treatment is used only in cases of actual hæmorrhage, or to cover a minor operation, very large amounts of blood would be required. Failure to attain the therapeutic level will lead to the use of still more blood, because continuous bleeding will cause further loss of A.H.G. Case 3, after a previous dental extraction, had received some 40 pints of blood but bled for six weeks. Incidents such as these put a great strain on an already overloaded transfusion service.

The ultimate goal of treatment with A.H.G. is continuous replacement, as in the treatment of pernicious anæmia with vitamin B_{12}, and of diabetes with insulin. Only in this way can the patient be maintained in a normal state and the danger of internal hæmorrhage and hæmarthroses avoided. But such maintenance therapy would be impracticable if only human A.H.G. were available, since it would need a special panel of about 500,000 donors to treat the 500 hæmophilics estimated to exist in this country. It would be quite practical if the A.H.G. could be derived from ox blood, which is about sixteen times as active as human blood and is available in ample amounts.

This preliminary clinical trial of a preparation of bovine A.H.G. is sufficiently promising to warrant further active investigation. Its administration to three hæmophilics produced the expected effect on clotting, which was in each case restored to a physiologically effective level for several hours after each injection. In cases 1 and 2 there was virtually no bleeding after dental extraction, a result which previous experience demonstrates must be highly significant. In case 3 the removal of sixteen teeth at the patient's own wish was a severe test, and there was fairly brisk bleeding for the first few hours after extraction. In this case, however, there was the later recognised complication of thrombocytopenia; and the fact that no transfusion was necessitated by the postoperative hæmorrhage indicates that even the curtailed course of A.H.G. therapy must have had a considerable beneficial effect.

The general objection to the use of animal material is its antigenicity. Injections of ox-plasma protein will probably induce the formation of antibodies and lead to the danger of allergic reactions on further injections. Our own material seems to have produced slight sensitisation, since only doubtfully positive skin tests and precipitin reactions have been obtained during the weeks following the therapeutic trial. The bovine A.H.G. used by us therefore seems not to be a powerful antigen—a point which is being investigated by experiments on animals. If better purification is achieved, the antigenicity may be reduced further. The nature of the antihæmophilic factor is unknown; it might be a substance which, like insulin, is relatively non-antigenic.

The specific objection to the preparation used in this trial is its power to agglutinate human platelets in vitro and the occurrence of profound thrombocytopenia in the one patient in whom platelet-counts were made after its use. It is not known if a similar effect was produced in the two other patients, because, there being

no reason to suspect thrombocytopenia, platelet-counts were not made after the injections. But an increase in the prothrombin-consumption index after injection in case 2 suggests that the platelet-count may have been reduced in that case also. Although the temporary thrombocytopenia in case 3 produced no apparent ill effects and caused no purpura it was felt to be a sufficiently serious complication to postpone further human trials with bovine A.H.G. until more information on the nature of this effect is obtained. Inter-species platelet agglutinins have been described by Mushett et al. (1953), and these could be separated from other agglutinins by fractionation of the plasma. It may prove possible to separate the antihæmophilic effect from the platelet-agglutinating activity. If this is so, more extensive trials of the material will be made.

Summary and Conclusions

The effective treatment of hæmophilia by replacement of the deficient factor requires large amounts of blood not easily obtainable from human sources.

Bovine blood has about sixteen times the antihæmophilic activity of human blood, and enough would be available for the continuous treatment of the whole hæmophilic population of this country.

A preparation of bovine antihæmophilic globulin has been produced, of which 1 g. has an activity equivalent to about 20 pints of normal human blood, assayed by the thromboplastin-generation test.

Three hæmophilic patients received intravenous injections of this material, with the expected rise in the antihæmophilic activity of their blood.

In two cases so treated dental extraction produced no abnormal bleeding. In the third case the removal of sixteen teeth caused bleeding for several hours but did not necessitate transfusion.

No ill effects were observed in the first two cases. In the third case the injections produced thrombocytopenia but no purpura.

The bovine material used agglutinated human platelets, and attempts will be made to eliminate or reduce this action before proceeding with further trials in man.

The material has shown some slight antigenic properties, which it is hoped may be reduced as purification methods are improved.

We wish to thank Dr. A. H. T. Robb-Smith for his encouragement and valuable advice; the three volunteers for their courageous coöperation; Dr. P. C. Mallam for admitting the three volunteers to his wards, his acceptance of clinical responsibility, and the help given by his staff; Messrs. Metropolitan Vickers for advice on sterilisation by ultraviolet light and for lending us the necessary equipment; Dr. B. R. Frisby, of the Oxford Regional Public Health Laboratory, for the sterility tests; and Mr. C. Annand Smith and Mr. J. M. Helsby for the dental extractions. We gratefully acknowledge the technical assistance of Mrs. J. Eveling and Miss G. Richards.

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ANGINA OF EFFORT

USE OF HEPARIN FOR ITS CONTROL

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RECENT work has suggested a relation between the amounts of certain classes of lipoprotein molecule in the plasma and a tendency to atheroma (Gofman et al. 1950, 1951, Jones et al. 1950). In particular, an increase of lipoprotein molecules in the Sf 10–30 range has been associated with the development of atherosclerosis in both animals and man (Lindgren et al. 1951). The possible relation of these abnormal lipoprotein patterns to myocardial infarction and anginal pain is of considerable practical interest.

Graham et al. (1951) claimed that in cholesterol-fed rabbits the quantity of large-molecule lipoproteins in circulation was reduced by a single injection of sodium heparin intravenously. Daily injections of heparin to half of a group of rabbits on an atheroma-producing high-cholesterol diet had a protective action. Of the group receiving heparin, only 3 out of 20 showed atherosclerosis, whereas of those not so treated 15 out of 20 developed gross atherosclerosis.

Lyon et al. (1951) reported a higher rate of myocardial infarction and of angina of effort when the Sf 10–20 concentration was highest (Svedberg unit range of rate of migration in the ultracentrifuge). They added that in coronary disease low-fat low-cholesterol diets reduced the Sf 10–20 level and considerably reduced the occurrence of new myocardial infarction. Also, in 30 out of 32 patients with angina of effort pain was relieved for 3–10 days by a single injection of heparin 20–100 mg.

This was confirmed by Donzelott and Kaufmann (1952), and Basud and Stewart (1950) concluded that heparin lowered the plasma-cholesterol most when the initial figure was high. Ethyl bicoumacetate ('Tromexan') as an alternative anticoagulant had no effect on the blood-cholesterol level. In a series of cases in which the plasma-cholesterol range was 200–268 mg. per 100 ml., the total cholesterol fell by 20–60 mg. when heparin was given.

Graham et al. (1951) described a clearance of lipid particles in human plasma in vivo by heparin. They treated atherosclerotic patients by twice-weekly injection of heparin 50–100 mg. intravenously or intramuscularly, and of their 59 patients who had angina of effort (45 had had a definite coronary thrombosis) 55 obtained great benefit and needed far less nitroglycerin.

A Clinical Investigation

We felt that the possible value of heparin for the relief of anginal pain deserved further investigation and that this could well be undertaken by a group of general practitioners. Most practitioners have several patients with angina of effort whose behaviour, trinitrin needs, and so on, are well known to them. In view of the statement that great relief of pain followed a single injection of heparin, we thought that with twice-weekly intramuscular injections of 100 mg. for one month any benefit gained should be apparent. As an additional check the following sequence of courses was given so as to see whether there was any detectable difference when heparin was administered and when it was omitted. (Procaine was included because intramuscular injection of heparin is painful.)

1. Twice-weekly intramuscular injection of 100 mg. of heparin, with 0·5 ml. of 1% procaine, for four weeks; followed immediately by

2. Twice-weekly injection of 1 ml. physiological saline solution, with 0·5 ml. of 1% procaine, for three weeks; followed immediately by

3. Twice-weekly injection as in the first period, for five weeks.

SUMMARY OF FINDINGS

Case	Sex	Age (yr.)	Duration	Previous infarct	E.C.G.	X-ray screening	Serum-cholesterol before and after	B.P. before	B.P. after	Assessment of improvement
1	M	67	2 yr.	1951	Deep Q_3	N.A.D.	174/ 219 +	155/ 85	140/ 95	2
2	F	51	6 mos.	Yes	Q_3 inv. CR7	L.V.2 +	227/ 285 +	215/ 120	170/ 100	2
3	M	65	4 yr.	1949	..	..	..	..	..	5
4	M	64	5 yr.	1948	N.A.D.	N.A.D.	210/ 235 +	155/ 100	140/ 70	2
5	F	72	6 mos.	No	L.A.D.	N.A.D.	220/ 243 +	200/ 110	190/ 90	3
6	M	58	6 mos.	1952	Q_1	N.A.D.	236/ 300 +	180/ 110	140/ 90	4
7	M	61	10 yr.	?	Q_3	N.A.D.	235/ 200 −	200/ 140	160/ 95	3
8	M	58	2 mos.	1952	$Q_2 + _3$	N.A.D.	210/ 231 +	170/ 90	168/ 75	1
9	M	40	9 mos.	No	N.A.D.	L.V.1 +	260/ 282 +	128/ 78	138/ 80	3
10	M	54	3 yr.	No	N.A.D.	N.A.D.	200/ 192 −	190/ 90	140/ 80	2
11	F	57	2 yr.	No	Slur QS_3	L.V.1 +	255/ 224 −	190/ 100	240/ 110	4
12	M	43	3 yr.	1950	Old infarct	N.A.D.	270/ 205 −	158/ 85	125/ 80	1
13	M	65	3 mos.	No	N.A.D.	N.A.D.	190/ 267 +	165/ 100	135/ 80	1
14	M	56	10 yr.	No	N.A.D.	N.A.D.	167	125/ 90	..	5
15	M	65	7 yr.	1948 1952	Q_3	L.V.1 +	370/ 217 −	170/ 100	168/ 100	2
16	M	59	8 yr.	No	N.A.D.	N.A.D.	268	148/ 88	140/ 70	1
17	M	62	3 yr.	No	N.A.D.	N.A.D.	192/ 275 +	130/ 90	130/ 80	2
18	M	53	2 yr.	No	N.A.D.	L.V.1 +	160/ 156 −	155/ 80	150/ 85	4
19	M	73	9 mos.	No	L.A.D.	L.V.1 +	.. 235	160/ 120	214/ 130	3
20	F	60	7 yr.	No	L.A.D.	L.V.1 +	261/ 290 +	195/ 100	218/ 110	3
21	M	39	2 mos.	No	L.A.D.	N.A.D.	210/	140/ 95	..	5
22	M	57	1 yr.	No	N.A.D.	N.A.D.	200/ 215 +	140/ 105	150/ 88	4

L.V.1 +, &c., refers to enlargement on a scale of 1 for minimal and 4 for maximal enlargement of the left ventricle observed on radioscopy.
N.A.D. = nil abnormal detected.

The changes of treatment were of course made without the patient's knowledge.

Before treatment began a careful history was taken, with full clinical examination, X-ray cardioscopy and barium swallow, electrocardiogram, and estimations of serum-cholesterol and hæmoglobin. Particular attention was paid in the history to the trinitrin requirements, the amount of exercise normally taken, the severity of the pain, and the threshold of onset. As far as possible the cases chosen for treatment were stable in their use of trinitrin. Total-cholesterol estimations before and after treatment were made, in view of the statement of Ancel Keys (1951) that these give a more useful indication of the likelihood of atherosclerosis and coronary disease than do estimations of particular fractions. The general practitioners kept records of their patients' comments at different stages, and at the end of the test the patients' condition was again fully investigated.

In the accompanying table, which summarises the findings, the figures in the last column are to be interpreted as follows :

1. Great improvement, both in degree of pain and ease of production with increased exercise tolerance (4 cases).
2. Improvement, but qualified by a greater degree of care on the patient's part, or by concurrent loss of weight (6 cases).
3. Doubtful improvement (5 cases).
4. No change (4 cases).
5. Worse. 1 stopped treatment after three injections as he had unpleasant reactions ; 1 stopped after five weeks because he felt he was being made worse ; and a 3rd developed an infarct during treatment. It will be realised of course that heparin was not being given as a continuous anticoagulant.

Only 1 man, out of the 10 cases improving, noticed any difference when the saline injections were substituted. This is directly contrary to the experience of Graham et al. (1951) who found in 9 cases that the pain rapidly returned when heparin was stopped.

No consistent effect on the total-cholesterol levels was evident. Indeed in half the cases the level rose during the course ; nor was there any strict correlation between serum-cholesterol change and clinical improvement. Radioscopy with swallowed barium demonstrated no hiatus hernias in this series. (We are indebted to Dr. J. Rabinowitch, radiologist to the Bushey and District Hospital, for his radiological help.)

Conclusions

1. Heparin in the dosage used had no consistent demonstrable effect on the electrocardiogram, on the serum-cholesterol (total) or on the blood-pressure.

2. The apparent effect on the pain of half the patients suggests that the method deserves trial where pain is frequent and easily produced. No more can be claimed than this.

The following general practitioners took part in this investigation based on a hospital where some of them are members of the staff :

Dr. K. J. AVELING, Bushey
Dr. J. BENDAS, Edgware
Dr. A. CREE, Edgware
Dr. G. N. GROSE, Edgware
Dr. D. G. JARMAN, Bushey
Dr. LEES LOW, Bushey
Dr. A. LETCHNER, Harrow Weald
Dr. N. C. MOND, Kingsbury
Dr. J. B. RUSSELL, Kenton
Dr. D. G. WILSON, Bushey Heath

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CHOLECYSTECTOMY

A METHOD FOR THE DIFFICULT GALL-BLADDER

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FOR the patient, traumatic stricture or damage to the bile-ducts is a tragic and perhaps fatal accident ; to the surgeon a deep and humiliating disappointment ; and to the one who attempts reconstruction a formidable and oft recurring trial of strength and endurance leading to failure or death to a considerable number of patients. Consequently any procedure that will protect the ducts from damage merits consideration and trial. I describe here a method which has been tried in a limited number of cases for some years and has proved safe and rational even in difficult and troublesome situations.

As Maingot (1948) says, " When access proves difficult or the parts concerned in the operation have not been clearly visualized, excision of the gall-bladder is always a hazardous undertaking." One of the main hazards in the difficult gall-bladder is the dissection of the structures at the neck. Here, owing to the inflammation, the structures cannot be readily exposed, especially above and to the left of the infundibulum and neck. In these circumstances accidents may happen and bleeding be excessive, requiring the blind application of forceps in a field flooded with blood. This type of case is often

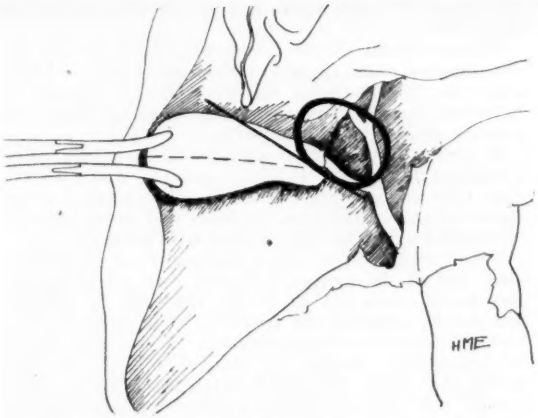

Fig. 1—Forceps placed on fundus in preparation to opening gall-bladder down broken line. Heavy oblique line is "imaginary line" mentioned in text. Heavy oval line encloses "dangerous area."

complicated by a previous duodenal or colonic fistula, the gall-bladder being contracted and fibrosed, and its wall thickened, with a tendency to be as tough as cartilage. Here it is often decided to do a drainage operation for the present, to be followed by removal later.

Because benign strictures virtually always follow surgical trauma, prevention of them is all-important. Flickinger and Masson (1946) observe that cholecystostomy and choledochostomy appear to be of minor importance as agents responsible for damage to the bile-ducts.

The reason for describing this operation is the increasing incidence of damage done to the bile-ducts. Waugh et al.

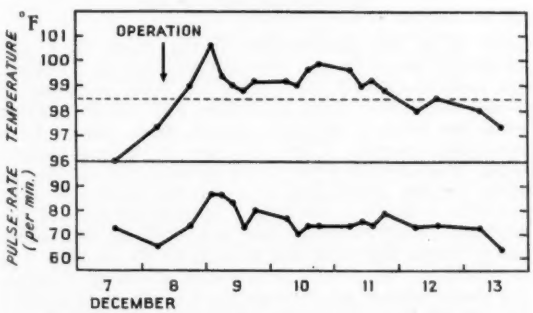

Fig. 2—Typical postoperative temperature and pulse-rate.

(1952) at the Mayo Clinic reported 83 cases repaired in 1951—a 46% increase over the total for 1950.

In the present operation no attempt is made to dissect out the cystic artery or the cystic duct. The branches of the artery are stitched over as they ramify in the remaining gall-bladder wall. The cystic duct is not tied; its mucosa is fulgurated at its opening into the gall-bladder. Biliary fistula has not developed in any of the 23 cases done by this method. If no dissection is done above and to the left of the imaginary line shown in fig. 1, and all operating is done to the right and below this line, no possible damage can be inflicted on the ducts or vessels. To do this, one is obliged to leave in situ the cystic duct and part of the gall-bladder wall —i.e., that portion of the neck, infundibulum, and body lying above and to the left against the liver bed. This acts as a shield to the vulnerable structures. Apparently this can be done with safety, provided that the mucosa is destroyed with phenol or with the electric cautery.

This operation should not be confused with that practised and recommended by Pribram (1939), Love (1947), and Thorek (1936), who do the usual dissection of the neck, displaying the cystic duct and artery, and ligating and cutting the duct and artery as in retrograde cholecystectomy. They then leave in that portion of the gall-bladder wall attached to the liver, and fulgurate or coagulate its mucosa to avoid postoperative abdominal drainage which they consider harmful. I feel that, if the ducts and artery can be safely dissected out, conventional cholecystectomy should be done.

To date I have done 23 cases by this method, an average of about 2 cases every three years. On reviewing the records of the last 100 gall-bladders operated on by me at the Royal Jubilee Hospital, in Victoria, I find that 9 were done with the electric cautery and 2 with phenol cauterisation of the mucosa. These 23 cases have all done well, and there have been no complications, fistulæ,

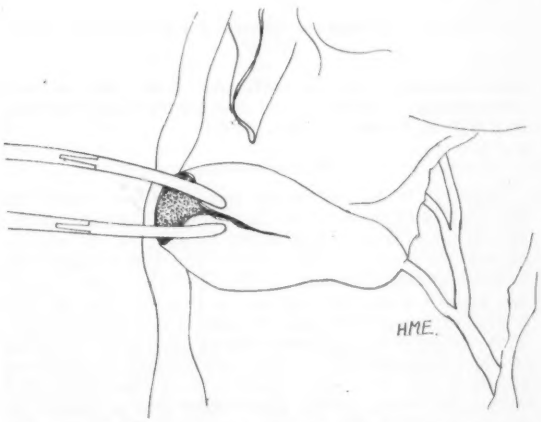

Fig. 3—Forceps applied down wall, and gall-bladder opened further.

abscesses, or late sequelæ. Fig. 2 shows typical postoperative reactions of temperature and pulse-rate.

Possibly I do this operation more frequently of later years because I have confidence in its safety. It is done in any case where serious difficulties are anticipated in dissecting out the structures at the neck of the gall-bladder.

In planning this operation due regard has been paid to the possible presence of abnormalities. Flint (1923), reviewing the anatomy of the bile-ducts and vessels in 200 cases, found only 69 that agreed with the so-called

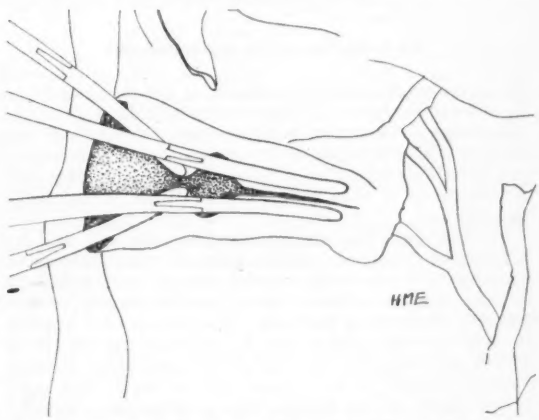

Fig. 4—Gall-bladder being opened toward neck between forceps.

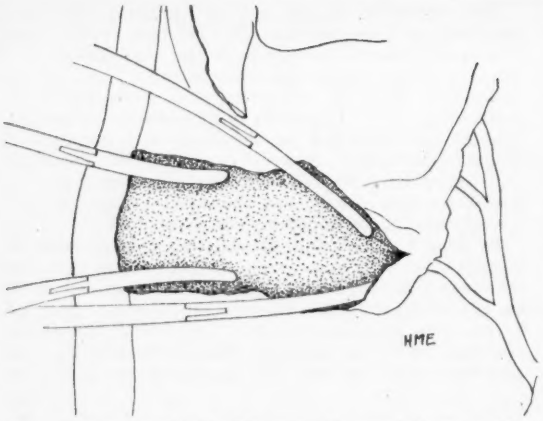

Fig. 5—Interior of gall-bladder fully exposed in preparation for excision of wall.

normal anatomy of the textbooks. Only one common abnormality is involved, and it is no particular problem and will be discussed later.

THE OPERATION

When it is decided to do this operation instead of the usual cholecystectomy, the fundus of the gall-bladder is grasped with a pair of artery forceps (fig. 1), and an opening is made into its cavity, the bile is aspirated, and any stones are removed. Two pairs of artery forceps are applied down the wall on its free side (fig. 3), and a further incision is made between them with scissors. This cutting between forceps is continued until the region of the cystic duct is reached, any further stones being removed (fig. 4). The duct is next identified from within the cavity of the gall-bladder and is probed for stones and, if necessary, slit up over a narrow grooved director, the surgeon always cutting below and to the right. By carefully proceeding down the cystic duct

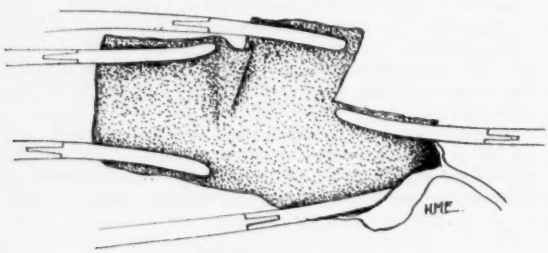

Fig. 6—Starting excision of redundant wall.

the common duct can be opened if this is thought to be advisable. One should not hurry at this stage of the operation. When the common duct is reached, the incision passes downwards along its course, any necessary manipulations for clearing the duct are undertaken, and a catheter or T tube is inserted and fixed in the usual manner.

We now have the gall-bladder laid open and held by a series of forceps around its edge (fig. 5). Starting at the region of the neck, curved forceps are applied as in figs. 6–8, care being taken not to attempt a too generous removal of the wall. Forceps are only applied to that portion which can be exposed readily from within and from without. After the application of these forceps excision of the excess wall is begun and continued until all the excess wall is removed. Usually the portion remaining is from half to three-quarters of the upper left wall, which is normally attached to the liver bed.

Figure-of-eight double-O chromic catgut sutures are next inserted round the edge of the remaining gall-bladder wall, the forceps being removed as the sutures are tightened (fig. 9). This controls all bleeding. Only the mucosa remains to be dealt with.

If phenol is used it is applied with a tightly rolled applicator to prevent flooding, and the whole area is gone over several times, great care being taken in the region of the cystic duct. Alcohol and saline solution are applied after the cauterisation with phenol.

With the electric cautery a needle-pointed electrode is used, and all the mucosa is treated with a low current, care being taken not to be too thorough or vigorous and not to cauterise the interior of the cystic duct to within 5 mm. of the common duct. The mucosa should be superficially charred at completion. At no time should the needle be forced into the tissues to coagulate deeply. Any residual bleeding points around the edge are next touched with the needle. Personally I prefer the electric cautery, but I can see no difference in the results of the two methods. Phenol was used originally for convenience. The electric cautery is more controllable. With phenol there is always the potential danger that

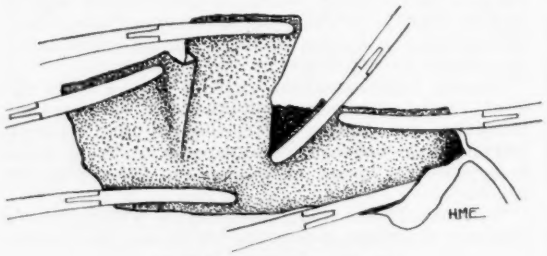

Fig. 7—Further excision of wall.

some of it may accumulate in the cystic duct and eventually make its way into the common duct. When the cauterisation of the mucosa has been completed, a 1-inch soft rubber drain is inserted and held in position with one triple-O chromic catgut stitch placed in a convenient portion of the cut edge of the gall-bladder wall. A small catheter is placed down to the subhepatic space for the instillation of a suitable antibiotic after the skin is closed; this is not an essential part of the operation, and naturally was not used in the earlier cases. Little difference can be seen by its use, but it is comforting. The wound is closed in the usual manner, the drain coming out through the incision or through a separate stab wound as desired.

The aftercare is more or less routine except that the rubber drain is left undisturbed for about seven days and then is withdrawn 2 inches a day, being out on the tenth or the eleventh day. Some bile-stained mucoid material usually drains out. The patient may be ambulant early or late as the individual case indicates.

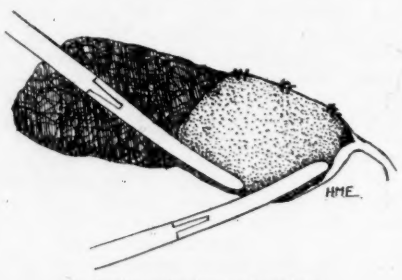

Fig. 8—All redundant wall excised.

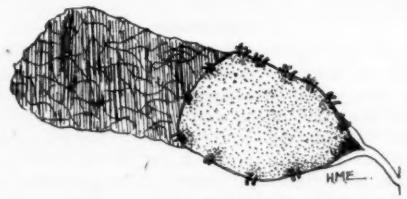

Fig. 9—Sutures inserted around cut edge. Mucosa to be fulgurated.

POSSIBLE DANGERS

The possible dangers are as follows :

(1) Attempting to remove too much of the upper part of the wall of the gall-bladder in an effort to make this operation resemble the standard cholecystectomy, consequently entering the danger area, and imperilling the ducts and vessels. A generous portion of the wall should be left as a protective shield.

(2) By the too liberal use of phenol or by using too powerful a current when coagulating the mucosa and so damaging adjacent structures. These are only possibilities to be considered.

(3) Secondary hæmorrhage due to sloughing along the edge of the gall-bladder wall and involving branches of the cystic artery. In this series this has not happened, but I have always felt this to be a distinct possibility.

(4) Damage to an abnormal cystic artery with hæmorrhage in those cases where the cystic artery arises from the hepatic artery low down or from the gastroduodenal artery and enters the gall-bladder from its under surface—i.e., in the region of Hartmann's pouch. This should not give any trouble, because it will be clamped with the forceps applied to the wall before it is cut away.

(5) Persistent mucous fistula. Careful attention to cauterising the mucosa will prevent this.

(6) Persistent biliary fistula. Theoretically one would expect this to develop at times, but in this series it has not. Perhaps the cauterisation of the duct effectively seals it off.

None of the above complications has been observed in the 23 cases. On the contrary, all the cases have been singularly free from any trouble. Still, I think these and other possible dangers should always be in one's mind when using this method.

SUMMARY AND CONCLUSIONS

A safe method for the removal of a difficult gall-bladder is presented. It is of use in those cases in which, at the time of operation, the gall-bladder is considered too dangerous to remove because of inflammation around the neck, requiring hazardous dissection with attendant hæmorrhage and possible damage to the biliary ducts and vessels.

In seventeen years 23 patients were operated on by this method with no untoward immediate or late postoperative sequelæ.

The method can be used together with exploration of the common duct.

The operation is not to be confused with the cauterisation method advocated by Pribram (1939) and others. Its principle is entirely different: all the surgical manœuvres are confined to an area clearly visible at all times, and no attempt is made to dissect out the vessels and duct at the neck. On the contrary, one tries to keep as far away as possible from these structures. By working from within the cavity of the gall-bladder they are at all times protected by that portion of the wall left in situ.

The operation is not difficult and will probably appeal but little to some surgeons, but it may be of use to those who suddenly find themselves confronted with a situation which appears to be beyond their skill to solve at one stage.

I believe that damage will not be inflicted on the ducts or vessels when using this method, provided that a portion of the gall-bladder wall is left as a protection and that no dissection is done in the vicinity of these structures.

I am indebted to Dr. H. M. Edmison, of Victoria, B.C., for the diagrams.

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KERNICTERUS FOLLOWING EXCHANGE TRANSFUSION

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A TRIALS committee of the Medical Research Council is at present considering the indications for, and the results of, treatment of hæmolytic disease of the newborn. A preliminary report (Mollison and Walker 1952) shows that the use of exchange transfusion has greatly reduced the incidence of kernicterus : of 62 infants treated in this way 4 developed kernicterus, 3 of them being premature babies. A similar improvement has occurred in the U.S.A. with the use of exchange transfusions : " It seems entirely probable that kernicterus can be practically eliminated as a complication of erythroblastosis fœtalis " (Allen et al. 1950).

Experience in Dundee in 1952–53 has, however, not been so encouraging. During these two years there were 30 infants with hæmolytic disease of the newborn : 10 were considered to need no treatment, 16 had exchange transfusions, 1 died during exchange transfusion, and 3 had simple transfusions. Kernicterus developed in 5 infants, of whom 4 had had exchange transfusions, 3 of these 4 being premature babies.

2 cases of kernicterus following exchange transfusion also occurred in 1950–51. Both infants were mature, the birth-weights being 6 lb. 5 oz. (cord-blood Hb 12·6 g. per 100 ml.) and 7 lb. 13 oz. (cord-blood Hb 11·2 g. per 100 ml.). Both received exchange transfusions shortly after birth, packed cells being used. The 1st child was seen at the age of 1 year and 9 months and showed severe choreo-athetosis ; the 2nd died on the third day, and kernicterus was found at necropsy. These 2 cases are mentioned because the infants were mature, and because packed cells were used for the replacement transfusions ; they will not be considered further here.

Case-records

Case 1.—A boy weighing 5 lb. 1 oz. was born after normal pregnancy and labour at home. The mother's blood was not examined before the birth. This pregnancy was the mother's sixth. The fifth baby became jaundiced shortly after birth but was not treated ; the others were apparently unaffected. When jaundice developed in case 1 a few hours after birth, he was transferred to hospital, where the direct Coombs test was found to be positive, the blood group-A Rh-positive, and the capillary blood Hb 19·6 g. per 100 ml.

Exchange transfusion with group-A Rh-negative blood, seven days old, was given twenty hours after birth, 350 ml. of blood being exchanged. Later the same day the capillary-blood Hb was only 9·6 g. per 100 ml. ; so a simple transfusion of 80 ml. of group-A Rh-negative blood was given. The jaundice, which was then considerable, increased steadily during the next two days. On the third day the capillary Hb was 16·8 g. per 100 ml. On the fourth day the infant developed head retraction, hypertonicity of limbs, inability to suck, and a cerebral cry. These signs gradually improved during the next few weeks, but at the age of sixteen months the limbs were hypertonic and the baby could not hold up his head or sit up.

He was alert and did not appear to be frankly mentally defective, but he was abnormally restless. There was no sign of deafness.

Case 2.—A boy weighing 4 lb. 10 oz. was born of a normal pregnancy by spontaneous breech delivery with difficulty, but there were no clinical signs of asphyxia. The mother's blood was group-AB Rh-negative and contained antibodies. This was her third pregnancy, and the second baby had been affected and treated by exchange transfusion. The direct Coombs test on the cord blood was positive, the baby's blood being group-A Rh-positive and his liver and spleen slightly enlarged. His cord-blood Hb was 10 g. per 100 ml.

Exchange transfusion with group-A Rh-negative blood, nine days old, was given one and a quarter hours after birth, 309 ml. of blood being removed and 332 ml. injected. The transfusion was well tolerated, and the capillary-blood Hb twelve hours later was 18·2 g. per 100 ml. During the second and third days the jaundice deepened, but there were no symptoms and the Hb was 16·8 g. per 100 ml. Early on the fourth day there was a sudden onset of cyanosis, head retraction, and inability to suck. The infant appeared collapsed and, though there was temporary improvement with resuscitation, terminal hæmorrhagic phenomena developed six hours after the onset, and the baby died. Necropsy showed yellow staining of the nuclei in the medulla and of the periventricular white matter

Case 3.—A girl weighing 5 lb. was born of a normal pregnancy and labour, but the mother's blood was group-AB Rh-negative and contained antibodies. Her only previous pregnancy had produced an unaffected infant. The direct Coombs test on the cord blood was positive, the baby's blood being group-A Rh-positive and the cord-blood Hb 15·4 g. per 100 ml.

Exchange transfusion was given one and a half hours after birth with group-O Rh-negative blood, fourteen days old, 336 ml. being removed and 390 ml. injected. The baby collapsed at the end of the transfusion but recovered quickly with resuscitation, including the removal of 20 ml. of blood. Next day the jaundice deepened and the capillary-blood Hb was 11·2 g. per 100 ml. On the third day there was a sudden onset of extreme rigidity of the limbs, spine, and neck, a cerebral cry, and failure to suck. Shortly afterwards rhythmic and athetoid movements of the upper limbs occurred. During the ensuing week the involuntary movements subsided, the muscle stiffness diminished, and feeding by bottle was resumed. At the age of three weeks no abnormal signs were present, but the capillary-blood Hb was 7·2 g. per 100 ml.; so a simple transfusion of 100 ml. of group-O Rh-negative blood was given. At the age of two months there were no abnormal physical findings.

Case 4.—A boy weighing 6 lb. 4 oz. was born of normal pregnancy and labour. The mother's blood was group-A Rh-negative and contained antibodies. This was her ninth child, the eighth child having died at the age of four days from severe icterus gravis. One of twins resulting from the fourth pregnancy also had icterus gravis. The direct Coombs test on the cord blood was positive, the baby's blood being group-A Rh-positive and the cord-blood Hb 14·7 g. per 100 ml.

Exchange transfusion was given one and a quarter hours after birth with group-A Rh-negative blood two days old, 440 ml. being removed and 480 ml. injected. During the next three days there were no symptoms, but jaundice slowly deepened, and on the third day the serum-bilirubin level was 17 mg. per 100 ml. On the fourth day, with capillary Hb 20·6 g. per 100 ml. and serum-bilirubin level 25 mg. per 100 ml., the baby developed head retraction and inability to suck, followed by hypertonicity of limbs and athetoid movements. The involuntary movements ceased after a further twenty-four hours, but head retraction persisted for three days. On the fourth day after the appearance of abnormal neurological signs bottle-feeding was resumed, and the baby went home at the age of twelve days, with capillary Hb 20·6 g. per 100 ml.

Readmission.—He was readmitted to hospital at the age of seven weeks because of increasing pallor and frequent epistaxes. Investigations showed that the serum-bilirubin level was 1·75 mg. per 100 ml., prothrombin-time normal, thymol turbidity 2 units, cephalin flocculation negative, alkaline phosphatase 55 King-Armstrong units %, and plasma-protein level 5·2 g. per 100 ml. (albumin 3·5 g. per 100 ml., globulin 1·7 g. per 100 ml.). No abnormal neurological signs were present, and the baby was transferred to another hospital, nearer his home, but he died. The necropsy findings are not yet available; the brain was not sectioned before fixation.

Discussion

In cases 1–4 the onset of abnormal cerebral signs was preceded by steadily increasing jaundice, but only in case 4 were repeated estimations made of the serum-bilirubin level, and in this case, at the time of symptoms, the level was 25 mg. per 100 ml. The diagnosis was confirmed at necropsy in case 2, but in cases 1, 3, and 4 it rested on the clinical findings. It is generally agreed, however, that the clinical features are usually adequate for diagnosis, though the increased liability of these infants to intracranial hæmorrhage must be borne in mind.

Indications for Exchange Transfusion.—We accept the following criteria of the need for exchange transfusion: (1) an affected baby weighing at birth $5^1/_2$ lb. or less; (2) an affected baby weighing at birth more than $5^1/_2$ lb. but with cord-blood Hb less than 14·8 g. per 100 ml.; and (3) an affected baby weighing at birth more than $5^1/_2$ lb. and having cord-blood Hb more than 14·8 g. per 100 ml., but with a bad family history—i.e., a previously severely affected sibling. These criteria correspond fairly well to those suggested as desirable by Mollison and Walker (1952). However, the amount of cord Hb may not truly indicate the severity or rapidity of the hæmolytic process, and recent work by Walker and Turnbull (1953) suggests that a high level may be a reflection, in part, of intra-uterine anoxia, and the risk of cerebral damage may be greater in such cases.

Length of Storage of Blood.—It is well known that, with prolonged storage, potassium and phosphate pass from the red cells to the plasma, and that after fourteen days' storage the plasma-potassium levels may rise considerably (up to 70 mg. per 100 ml.). Since the newborn baby may already have a high plasma-potassium level (up to 30 mg. per 100 ml.) toxic levels may be reached during exchange transfusion. In case 3 the transfused blood was fourteen days old, and the infant developed cardiac insufficiency at the end of the transfusion. Since this baby had not shown much anæmia at birth (cord Hb 15·4 g. per 100 ml.), hyperkalæmia may have developed. This is not known to affect the incidence of kernicterus, but the possibility of its occurrence does call for care in transfusion. If there is no alternative to using stored blood over seven days old, the amount of calcium gluconate injected should be increased and the rate of transfusion slowed.

Amount of Blood Exchanged.—It is usually considered that an amount corresponding to 70 ml. per lb. of body-weight is adequate. In cases 1–4 the average amount was 75 ml. per lb. Only in case 4 were packed cells used; in the other cases whole blood was transfused. American workers have said that the use of packed cells is not only unnecessary but also contra-indicated (Hsia et al. 1952a), because the transfused cells may undergo more rapid hæmolysis and raise the serum-bilirubin level unduly. Further, it is pointed out that the object of the exchange is to remove circulating antibodies and blood pigment in addition to supplying red cells, and that whole blood is the best medium for this.

Serum-bilirubin Level.—This has been estimated regularly only in case 4. Hsia et al. (1952b) have shown that a direct correlation exists between the height of the serum-bilirubin level and the development of kernicterus; with levels over 31 mg. per 100 ml. 50% of cases became affected, and with levels of 16–30 mg. per 100 ml. 18% were affected. The routine estimation of serum-bilirubin levels on small ill babies is unfortunately a difficult procedure. A micro-technique such as has been developed by Hsia et al. (1952c) in Boston would help greatly, but is not suitable for routine laboratory use. Another difficulty is to fix an arbitrary level of serum-bilirubin above which exchange transfusion is indicated.

Blood-sugar.—Although Gerrard (1952) has suggested that hypoglycæmia may contribute to the production of kernicterus, the normal standards for blood-sugar levels in newborn infants are not sufficiently defined to warrant interference with much hope of improvement. However, the question remains open.

Ætiology of Kernicterus.—The following theory regarding the pathogenesis of kernicterus is perhaps most acceptable at present :

(1) *Increased serum-bilirubin level :* Küster and Krings (1950) have shown, in the case of the young rabbit, that bilirubin, when present in sufficient concentration and for a sufficient length of time, is toxic to nerve tissue. A similar mechanism may operate in man, and Claireaux et al. (1953) believe that the pigment involved in kernicterus is indirect-reacting bilirubin.

(2) *Increased vascular permeability in hæmolytic babies and non-hæmolytic premature babies :* in this connection Morison (1952) writes of hæmolytic babies " this immaturity, and a real but not properly understood structural and functional inferiority of the tissues and organs of the foetus are not sufficiently appreciated." Perhaps, then, a hæmolytic baby should be considered premature when its birth-weight is less than $6^1/_2$ or 7 lb. instead of the accepted $5^1/_2$ lb.

Treatment.—If the principal factor is bilirubin, treatment should logically be directed towards lowering the serum-bilirubin level by repeated exchange transfusions. This has been done in America (Hsia et al. 1952a), the aim being to keep the level below 20 mg. per 100 ml., and the results appear to have been satisfactory. However, it must be remembered that exchange transfusion carries a risk, and that the success of repeated exchanges depends a great deal on the operator. Perhaps, too, a rapid rise in serum-bilirubin level is as likely to cause kernicterus as is a moderate persisting level. Abelson (1953) reports 2 cases in which exchange transfusion was given at the onset of abnormal neurological signs, with apparent recovery and freedom from residual disability. In one case the exchange was the first, and in the other the second. If this could be confirmed, treatment would be simplified, but from the discussion reported (Hsia et al. 1952a) it appears that confirmation is lacking. It seems probable that, until we know more about the ætiology of kernicterus, a small proportion of cases of hæmolytic disease will continue to develop kernicterus despite all therapeutic efforts, but that, in the meantime, keeping the serum-bilirubin as low as possible by repeated exchange transfusion offers the best hope of reducing the incidence.

Summary

4 cases of kernicterus have occurred in 16 infants treated by exchange transfusion for hæmolytic disease of the newborn. 3 of the cases were in premature infants.

2 additional cases, both in mature infants, are briefly reported.

Possible factors bearing on the production of kernicterus are discussed.

The use of repeated exchange transfusions to keep the serum-bilirubin levels low is mentioned.

My thanks are due to Prof. J. L. Henderson for his constant help and encouragement in the preparation of this paper ; to Dr. J. Thomson for permission to publish case 4 ; and to Dr. J. D. Andrew for giving the exchange transfusion in case 4.

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INTRASPLENIC PRESSURE AS INDEX OF PORTAL VENOUS PRESSURE

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THE spleen is largely composed of red pulp, which communicates freely with the intrasplenic portal venous radicles (fig. 1). It therefore seemed possible that the pulp pressure might be related to the portal venous pressure. The introduction of a safe method of percutaneous trans-splenic portal venography (Dreyer and Budtz-Olsen 1952, Bahnson et al. 1953, Walker et al. 1953) for the investigation of portal hypertension provided an opportunity of measuring the intrasplenic pressure through the needle used for injection of the contrast medium. Intrasplenic pressure has been measured by this technique and its validity as an index of portal venous pressure assessed. Results have been correlated with the portal venous pressure measured by occluding the hepatic vein (Paton et al. 1953) and directly at operation.

Methods

Intrasplenic pressure was measured in 28 patients with splenomegaly and suspected disease of either the liver or the portal vein, all of whom had a normal plasma-prothrombin time and blood-platelet count. They were placed recumbent with the left hand behind the head. A site was chosen in either the 8th or the 9th intercostal space in the mid-axillary line, and local anæsthesia was induced with 2% procaine solution down to and including the capsule of the spleen. A fine lumbar-puncture needle 7 cm. long, of outer diameter 0·7 mm., was inserted in a cephalad direction at an angle of 45° to the transverse plane. If the spleen was greatly enlarged below the costal margin, the needle was inserted subcostally directly into its outer surface. Resistance was met when the spleen was reached, and thereafter the patient was asked to breathe quietly. After penetrating 2 cm. into the spleen the stylet was removed, when blood could be seen dripping slowly from the needle. This was found to be a most valuable indication that the needle was in the correct position. The swing of the needle with respiration was

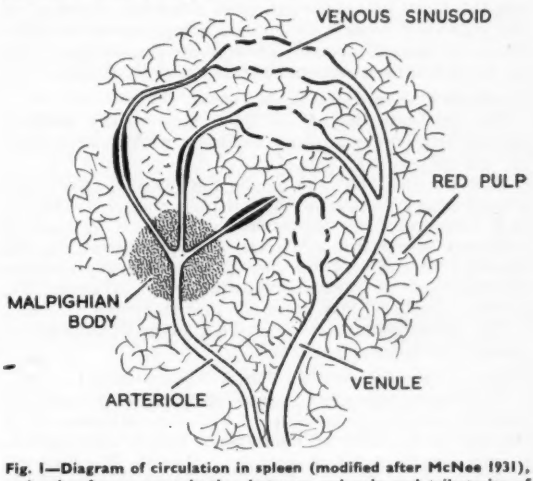

Fig. 1—Diagram of circulation in spleen (modified after McNee 1931), showing free communication between red pulp and tributaries of portal vein in the spleen.

not in any way restricted. The needle was connected with a strain gauge by a length of 'Polythene' tubing, and the pressure was recorded with the patient breathing quietly. The zero level was taken at a point 5 cm. below the sternal angle with the patient supine. In every instance the position of the needle in the spleen was confirmed by subsequent injection of contrast material for trans-splenic portal venography. The needle remained in the spleen for only 30 seconds, the time taken for the two procedures.

In 12 patients, after the initial pressure had been recorded, the needle was advanced a further 5 mm.; in this way pressures were obtained from two or three different positions in the spleen.

Intrasplenic pressure was measured directly at operation in 7 patients undergoing gastrectomy and compared with pressures obtained at the same time from a main portal venous tributary. These patients had spleens

TABLE I—AGREEMENT OF PRESSURES TAKEN FROM DIFFERENT PARTS OF SAME SPLEEN

Case no.	Pressure in different parts of spleen (mm. Hg)			Range of variation (mm. Hg)
	1	2	3	
1	5	5	4	1
2	6	6	6	0
3	4	6	8	4
4	9	10	9	1
5	10	10	10	0
6	15	10	12	5
7	12	14	..	2
8	17	12	14	5
9	15	15	19	4
10	19	21	..	2
11	24	21	..	3
12	25	20	20	5

of normal size and no evidence of portal venous hypertension.

In 22 patients the pressure obtained by occluding an hepatic vein was measured at a later date by catheterisation of the hepatic vein. This pressure is a measure of the intrasinusoidal pressure and therefore of the portal venous pressure (Paton et al. 1953).

Results

Safety

There were no complications and in particular no clinical evidence of intraperitoneal bleeding, but it must be emphasised that a fine needle was used and deep respiration was avoided. Puncture of the spleen at laparotomy enabled inspection of the puncture site, and the blood-loss never exceeded a few ml. Review of the published reports has revealed only transient side-effects of percutaneous trans-splenic venography, and no death has been reported (Atkinson et al. 1954).

Variation of Pressure in Same Spleen

The pressure tracing obtained was steady without pulsations. The respiratory variation with quiet breathing did not exceed 2 mm. Hg.

It is possible that the needle may occasionally enter a large artery instead of the red pulp and give a falsely high pressure. This happened only once in 75 readings and was confirmed by prominent pulsations on the tracing. This difficulty is prevented if in every instance two readings are taken in the spleen by advancing the needle a further 5 mm. after the first recording.

The intrasplenic pressure varied little from place to place in the same spleen (table I).

Results in Patients without Portal Hypertension

The intrasplenic pressure was measured in 14 patients without portal hypertension. 7 with normal spleens were studied at the time of laparotomy and 7 with splenomegaly during portal venography (table II). The pressure varied between 3 and 17 mm. Hg, and this has been taken as the range of normal.

TABLE II—SUMMARY OF RESULTS

Condition	No. of patients	Mean intrasplenic pressure (mm. Hg)	Range (mm. Hg)
Portal cirrhosis ..	11	25·5	17–35
Biliary cirrhosis ..	5	22·6	17–28
Extrahepatic obstruction of portal vein ..	5	24·4	20–29
Other patients:			
Normal spleen ..	7 } 14	10·3 } 10·0	3–17
Large spleen ..	7 }	9·7 }	

The pressure did not differ significantly between the 7 patients with spleens of normal size and the 7 with splenomegaly (table II). The size of the spleen therefore does not influence intrasplenic pressure.

Results in Portal Hypertension

The 11 patients with portal cirrhosis all showed an intrasplenic pressure greater than the upper limit of that found in the group without portal hypertension (table II). The mean value was $2^1/_2$ times that seen in the latter group.

The intrasplenic pressure was surprisingly high in the 5 patients with biliary cirrhosis. These patients, however, also showed a high portal venous pressure when it was measured by catheterisation of the hepatic vein.

Each of the 5 patients with extrahepatic obstruction of the portal vein had a high intrasplenic pressure.

Correlation of Intrasplenic Pressure with Estimated Portal Venous Pressure

In the 24 patients studied there was a statistically significant linear correlation between the intrasplenic pressure and the estimated portal venous pressure whether measured by occlusion of an hepatic vein or directly at operation (fig. 2). If the intrasplenic pressure is measured, it is possible to predict the portal venous pressure within 8 mm. Hg with a 95% degree of accuracy. The intrasplenic pressure exceeds the estimated portal venous pressure by 2–6 mm. Hg, the higher the pressure the greater the difference.

Extrahepatic Portal Venous Obstruction

In these patients the obstruction to the portal vein is extrahepatic, and the intrahepatic portal venous pressure is not raised. The pressure obtained by occluding an hepatic vein is therefore normal, and this finding,

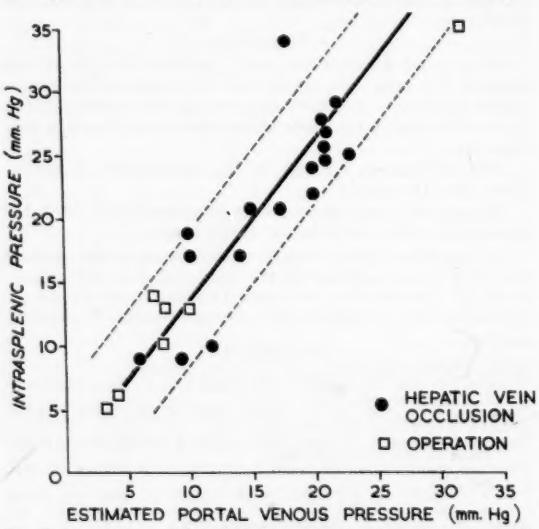

Fig. 2—Correlation of intrasplenic pressure with estimated portal venous pressure: solid circles, by occlusion of an hepatic vein; squares, at operation. Interrupted lines represent limits of 95% confidence.

in conjunction with a raised intrasplenic pressure, strongly suggests extrahepatic portal venous obstruction (fig. 3).

Case-report

A boy, aged 17, presented with gastro-intestinal bleeding. Four years previously he had had acute appendicitis complicated by pylephlebitis and liver abscesses. Splenomegaly was now the only abnormal clinical finding. Liver-function tests showed no evidence of hepatocellular damage, and aspiration hepatic biopsy revealed normal histology. Varices were not seen radiologically after a barium swallow. The intrasplenic pressure was raised (29 mm. Hg), but the pressure obtained by occluding an hepatic vein was normal (12 mm. Hg). These findings suggested that the portal vein was occluded as a result of the old infection, and this was confirmed by trans-splenic portal venography, which showed

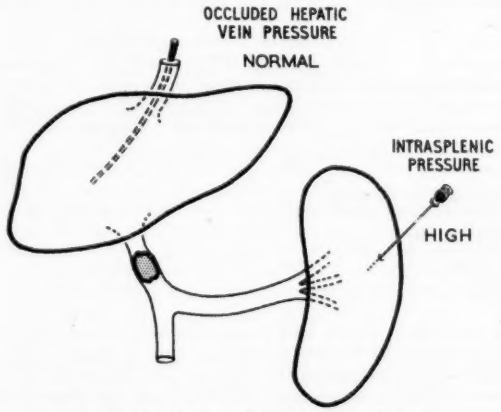

Fig. 3—Extrahepatic obstruction of portal vein.

compression of the portal vein within the liver, presumably by scar tissue.

Similar findings were observed in 4 other patients with extrahepatic portal venous obstruction which in every instance was confirmed by portal venography (table III).

Discussion

The tip of a needle introduced into the spleen will probably lie in the splenic pulp, which forms the great mass of the organ. Anatomically the pulp is in free communication with the splenic venules; therefore it is not surprising that intrasplenic pressure bears a close relation to the portal venous pressure measured directly or by occluding an hepatic vein. The intrasplenic pressure is slightly higher than the portal venous pressure, as would be expected from the direction of flow in the portal system.

A rise in intra-abdominal pressure will increase the portal venous pressure and will be reflected in both intrasplenic pressure and the pressure obtained by occluding an hepatic vein. Patients with tense ascites were not included in this series; high pressures on occlusion of an hepatic vein, however, are found in such patients, and a rise in the intrasplenic pressure would be expected. Contraction of the muscles of the abdominal wall will raise the intra-abdominal pressure, the portal venous pressure, and the intrasplenic pressure by not more than 2 mm. Hg.

Intrasplenic puncture is as safe as, and much simpler than, other current methods of determining the pressure in the portal venous system—e.g., catheterisation of an hepatic vein, puncture of œsophageal varices during œsophagoscopy (Allison 1951), and directly by puncture of a portal venous radicle at operation. It is simpler and can be done more frequently than transplenic portal venography.

The technique has many practical clinical applications. It may be used to confirm the diagnosis and to assess

TABLE III—ASSOCIATION BETWEEN PRESSURE OBTAINED BY OCCLUDING HEPATIC VEIN AND INTRASPLENIC PRESSURE IN EXTRAHEPATIC OBSTRUCTION OF PORTAL VEIN

Diagnosis	Age (yr.)	Sex	Pressure obtained by occluding hepatic vein (mm. Hg) (normal range 2–12)	Intrasplenic pressure (mm. Hg) (normal range 3–17)
Obstruction of portal vein by scar tissue	17	M	12	29
Portal cirrhosis and thrombosis of portal vein ..	49	F	7	25
Portal cirrhosis and thrombosis of portal vein ..	56	F	11	24
Portal cirrhosis and thrombosis of portal vein ..	59	M	10	20
Biliary cirrhosis and thrombosis of portal vein	41	F	7	24

the severity of portal hypertension in the patient with liver disease. It is useful in following fluctuations in the portal venous pressure during the course of cirrhosis of the liver. Measurements of intrasplenic pressure provide a convenient base-line before operations are undertaken to relieve portal venous hypertension, and may be repeated postoperatively as an indication of the efficacy of the operation. A rise in intrasplenic pressure after the operation of portacaval anastomosis, for instance, would strongly suggest closure of the venous shunt.

The intrasplenic pressure can conveniently be measured in the medical ward without simultaneous trans-splenic venography, and may be useful in elucidating the cause of undiagnosed splenomegaly. It may prove of value in the investigation of the cause of gastro-intestinal bleeding in association with splenomegaly. It should not be done until the bleeding has ceased.

Used in conjunction with catheterisation of an hepatic vein the method is useful for the diagnosis of obstruction of the portal vein.

Summary

Percutaneous splenic puncture with a fine needle is a simple and safe method of estimating the portal venous pressure. The intrasplenic pressure varies little throughout the spleen and is uninfluenced by the size of the spleen. It bears a linear relationship to the portal venous pressure estimated by other methods.

In 14 patients without portal hypertension the intrasplenic pressure was 3–17 mm. Hg, with a mean of 10 mm. Hg. In 11 patients with portal cirrhosis the mean intrasplenic pressure was 25·5 mm. Hg, in 5 patients with biliary cirrhosis 22·6 mm. Hg, and in 5 patients with extrahepatic portal vein obstruction 24·4 mm. Hg.

The value of this technique in the diagnosis and management of portal hypertension is discussed.

We are indebted to Mr. M. R. Ewing, F.R.C.S., for his coöperation; Dr. N. F. Coghill, Dr. E. D. H. Cowen, Dr. P. Gibson, Dr. J. D. Paulett, and Dr. J. D. Whiteside for kindly referring patients; Mr. J. I. MacNaughton and Mr. B. Rowe for technical assistance; and the Lund Fund of the Diabetic Association for an expenses grant.

ADDENDUM

Since this paper was written, we have observed that in one patient intrasplenic pressure fell from 35 to 18 mm. Hg after successful construction of a portacaval anastomosis, and in one other patient repair of a stricture of the common bile-duct resulted in a fall in intrasplenic pressure from 28 to 12 mm. Hg one year later.

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Preliminary Communication

HOMOLOGOUS SERUM JAUNDICE

AFTER TRANSFUSION OF WHOLE BLOOD, DRIED SMALL-POOL PLASMA, DRIED IRRADIATED PLASMA, AND KAOLIN-TREATED FILTERED LIQUID PLASMA *

FOR more than a decade homologous serum jaundice has been recognised as a delayed complication of transfusion of blood and plasma. The highest incidence has been observed after the use of large-pool plasma or serum—i.e., plasma or serum prepared from pools containing the plasma of 300 or more donations of blood. In 1946 Spurling et al.,[1] in a survey of 1054 patients who had received such plasma, found that 77 (7·3%) had developed homologous serum jaundice between one and five months after transfusion, whereas no cases were found among 891 recipients of whole blood. Brightman and Korns,[2] in the United States, observed the complication in 29 (4·5%) of 649 patients given dried plasma (size of pool not specified); 4 of the 29 patients died of hepatic necrosis.

Because of the high incidence of homologous serum jaundice after the transfusion of large-pool plasma, the Medical Research Council decided, in June, 1945, to discontinue the production of large-pool plasma and instead to prepare plasma from small pools in an effort to restrict the dissemination of the infective agent. The latter type of plasma is known as small-pool plasma and is derived from not more than 10 donations of blood.

In 1949 Lehane et al.[3] reported the results of a comparative survey of the use of dried large-pool plasma, dried small-pool plasma, and whole blood. These are summarised in table I.

TABLE I—RESULTS REPORTED BY LEHANE ET AL.

Transfusion fluid	No. of patients on whom incidence of jaundice is based	No. developing homologous serum jaundice attributed to transfusion	Deaths attributed to homologous serum jaundice
Whole blood	2772	22 (0·8%)	0
Dried small-pool plasma with or without blood	814	12 (1·47%)	1
Dried large-pool plasma with or without blood	820	100 (12·2%)	6

This survey showed that restriction of the size of plasma pool greatly reduced the incidence of homologous serum jaundice, and that the risk of this complication after dried small-pool plasma was little greater than that attaching to whole blood.

The observations of Oliphant and Hollaender [4] in 1946 and Wolf et al.[5] in 1947 had suggested that irradiation with ultraviolet light would inactivate the infective agent. Blanchard et al.,[6] using a known icterogenic pool of serum, reported in 1948 that, of a group of 15 volunteers, 3 developed hepatitis with jaundice, 1 hepatitis without jaundice, and 3 had presumptive hepatitis. Of 11 volunteers who received plasma from the same pool which had been irradiated, none showed any evidence of hepatitis. In the light of these results, "Minimum Requirements" of the U.S. National Institutes of Health, issued early in 1949, made the ultraviolet irradiation of plasma obligatory.† In 1950 reports of homologous serum jaundice after the transfusion of irradiated plasma appeared in the United States (James et al.,[7] Rosenthal et al.,[8] Barnett et al. [9]) but insufficient data were given to allow any assessment to be made of the incidence of this complication.

TABLE II—INCIDENCE OF JAUNDICE AFTER TRANSFUSION OF BLOOD, OF SMALL-POOL PLASMA, AND OF IRRADIATED LARGE-POOL PLASMA

Transfusion fluid	No. of patients on whom incidence of jaundice is based	No. developing jaundice of doubtful aetiology	No. developing homologous serum jaundice attributed to transfusion	Deaths attributed to homologous serum jaundice
Blood	2538	4	4 (0·16%)	0
Dried small-pool plasma with or without blood	867	0	1 (0·12%)	0
Dried irradiated large-pool plasma with or without blood ..	984	5	39 (3·96%)	1

Since irradiation with ultraviolet light under suitable conditions appeared to eliminate or at least reduce the risk of homologous serum jaundice, it was important to discover whether irradiated plasma in fact carried a smaller risk than small-pool plasma. The Ministry of Health and Medical Research Council therefore decided that plasma should be irradiated under carefully controlled conditions and that surveys should be made in the areas of three regional hospital boards (Cardiff, Liverpool, and Manchester) with the object of comparing the incidence of homologous serum jaundice after dried irradiated plasma with that (*a*) after dried unirradiated small-pool plasma, prepared concurrently by the usual methods in use since 1945, and (*b*) after whole blood alone. In these surveys each member of the population at risk was followed-up in a manner similar to that described by Spurling et al.[1] and Lehane et al.[3] The surveys were carried out during the period January, 1952, to June, 1953.

The plasma was irradiated in an apparatus designed on the Habel-Sockrider principle (Habel and Sockrider [10]) using a flow-rate of 5 litres per hour with an ultraviolet emission

* The surveys reported here were organised and carried out on behalf of the Ministry of Health, Medical Research Council, and the Department of Health for Scotland by an ad-hoc group consisting of: Dr. R. J. DRUMMOND and Mrs. B. F. WILLIAMS, Regional Transfusion Centre, Cardiff; Dr. D. LEHANE and Miss K. DAVIES, Regional Transfusion Centre, Liverpool; Dr. F. STRATTON and Mrs. K. J. COOPER, Regional Transfusion Centre, Manchester; Dr. J. WALLACE and Miss K. J. CLARK, Glasgow and West of Scotland Blood Transfusion Service, Glasgow; Sir ALAN DRURY, F.R.S., Institute of Animal Physiology, Babraham; Dr. W. d'A. MAYCOCK, Lister Institute, Elstree, Herts (consultant adviser to Ministry of Health); Mr. L. VALLET, Lister Institute, London, S.W.1; and Dr. J. T. BOYD, Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.

† Irradiation is still obligatory; it is now regarded as a means of maintaining the bacterial sterility of plasma.

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of 5·5 watts at 2537 A°. Voltage supply to the ultraviolet lamps, rate of flow, and other physical conditions were held constant during each "run." 15-litre pools from approximately 60–80 donors were first prepared from the 10-donor pools, and these larger pools were filtered and run through the irradiator in continuous sequence. The plasma from 600–800-donor pools was irradiated in this way during one "run." These operating conditions caused no significant changes in protein detectable by electrophoretic analysis.

The combined results of these three surveys are summarised in table II.

A fourth survey, arranged by the Department of Health for Scotland on the advice of the Advisory Committee on Medical Research and with the coöperation of the Scottish National Blood Transfusion Association, was organised in the same way as the English surveys and made in the Glasgow area during the period June, 1951, to August, 1953, to compare the incidence of homologous serum jaundice after kaolin-treated filtered liquid plasma (Maizels [11]) with that after whole blood alone. The liquid plasma was kept at room-temperature for varying periods of time; it was never "younger" than three weeks, and some was over twelve months old when transfused. Storage of plasma at room-temperature has been advocated by Allen et al.[12 13] as a means of inactivating the agent in plasma responsible for homologous serum jaundice. The maximum size of pools was derived from 140 donations of blood, seven 15–20-donor pools being clarified and filtered in continuous sequence. The results of this survey are summarised in table III.

TABLE III—INCIDENCE OF JAUNDICE AFTER TRANSFUSION OF BLOOD AND OF KAOLIN-TREATED PLASMA

Transfusion fluid	No. of patients on whom incidence of jaundice is based	No. developing jaundice of doubtful ætiology	No. developing homologous serum jaundice attributed to transfusion	Deaths attributed to homologous serum jaundice
Blood	1387	3	5 (*0·36%*)	0
Kaolin-treated filtered liquid plasma ..	1366	8	16 (*1·17%*)	0

GENERAL CONCLUSIONS

1. It is apparent that the exposure of plasma to ultraviolet light under the conditions used did not inactivate the causative agent of homologous serum jaundice.

2. The incidence of homologous serum jaundice after transfusion of the dried small-pool plasma is very low and does not differ significantly from that found after transfusion of whole blood; both are less than that found by Lehane et al.[3]

3. The incidence of homologous serum jaundice observed after kaolin-treated filtered liquid plasma was slightly smaller than that reported after dried small-pool plasma by Lehane et al.[3] but greater than that after dried small-pool plasma in the present English surveys. One of the cases of jaundice occurred after the transfusion of plasma ten months old, and another after plasma seven months old, which had been stored at room-temperature.

Full details of these surveys will be published elsewhere.

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Reviews of Books

Progress in Clinical Surgery

Editor: RODNEY SMITH, M.S., F.R.C.S., surgeon, St. George's Hospital. London: J. & A. Churchill. 1954. Pp. 414. 36*s*.

THE young surgeon seeking helpful instruction on those developments in clinical surgery which are too recent to be found in the textbooks is often faced with dogmatic but contradictory opinions which he must evaluate as best he can. Most of the original articles in medical periodicals are one-sided, and many postgraduate lectures are no less an expression of personal opinion. What the young surgeon needs is a balanced assessment of opposing views on controversial matters, with the arguments for and against fairly stated.

This symposium, by 20 well-established but not too senior surgeons, has been produced with the avowed purpose of helping "the postgraduate student working for his final F.R.C.S. examination and the younger surgeon with a recent hospital appointment," and it serves this purpose admirably. In comparatively short space most of what the postgraduate student requires to add to his textbook studies is condensed in highly readable form; and this is achieved without exclusion of the more specialised branches of surgery. There has inevitably been considerable selection of material but few will quarrel with the choice. The only omission calling for comment is that the otherwise excellent chapter on brain surgery contains no reference to tentorial impaction; but some will regret that the chapter on cancer of the mouth and pharynx has not the same impartiality as the rest of the work.

The book can be confidently recommended not only for the young surgeon but for more senior surgeons who find themselves unable to keep pace with the journals.

Plague

R. POLLITZER, M.D., formerly of the division of epidemiological and health statistical services, World Health Organisation. Geneva: W.H.O. Monograph Series no. 22. H.M. Stationery Office. 1954. Pp. 698. £3 5*s*.

WE have long been waiting for an authoritative and comprehensive textbook on plague, and here it is. Dr. Pollitzer was a co-author of a classical manual on plague published in 1936 and has spent his time since then continuing the struggle against plague in China. (An example of his scientific indifference to the wars and political upheavals going on around him was his arrest, when working with a League of Nations anti-epidemic team, for taking a photograph of entomological interest which unfortunately included a battery in action.) His new book is a re-edited compilation of studies published in the *Bulletin of the World Health Organisation* (1951–53) covering every aspect of plague, and it will undoubtedly be the standard textbook for some years to come.

Its ten chapters deal with the history and present distribution; the plague bacillus; immunology; pathology; laboratory diagnosis; hosts; insect vectors; clinical aspects; epidemiology; and control and prevention. It is fully up to date, in that it deals with the sulphonamides and antibiotics in treatment and with the new poisons and persistent insecticides in control. Most of the superb illustrations, particularly those in an annexe on the identification of flea-vectors contributed by F. G. A. M. Smit of the Museum at Tring, have never previously been published.

Those of us who think of plague as a menace of bygone days, or as something which affects the other fellow and not ourselves, will be convinced by a glance at the world maps showing recent human infections in 1952 that this is a parochial view. Even when the control of human plague is successful, the epizoötic threat remains, as the insidious spread of rodent plague across the United States has shown. As with yellow fever and tularæmia, watchfulness cannot be relaxed even in non-epidemic countries while the fire smoulders in the woods, since at any time a burning ember may start a conflagration, though modern methods of control and treatment should

limit the outbreak more quickly and with less serious results.

This is exactly the kind of major international scientific work which W.H.O. should sponsor.

• **Practique de l'hibernothérapie en chirurgie et en médecine**

H. LABORIT and P. HUGUENARD. Paris: Masson. 1954. Pp. 256. Fr. 1400.

PAPERS on artificial hibernation began to find their way into the medical press of this country only recently, though the elements of the technique and the use of individual drugs concerned in it have been slowly introduced into clinical practice during the last year or two. Its value cannot yet be assessed, but a controversy has already begun on its merits and potential dangers—even though the pharmacologists are at present unable to offer an account of all the actions of chlorpromazine, the agent chiefly used to produce it.

In this book Dr. Laborit and Dr. Huguenard, the surgeon and anæsthetist who first started the method and popularised the term "artificial hibernation," set out their ten years' experience; and numerous contributors, representing nearly every branch of medicine, add their opinions. Hibernation is recommended for conditions ranging from the treatment of premature babies to cerebral surgery, and from carbon-monoxide poisoning to malignant hypertension. Both theory and practice are dealt with in considerable detail. The complexity of the technique and the polypharmacy that it entails—as many as 15 drugs being used on occasion—will not appeal to many clinicians here, even though there is an apparently rational basis for all that is recommended. Nevertheless, hibernation undoubtedly has value for selected patients, and British workers who have tried it, using a limited number of agents, are mostly enthusiastic. The value of this volume would be greater if the results of hibernation had been compared with those produced by more orthodox methods of anæsthesia or treatment.

Hepatic Circulation and Portal Hypertension

CHARLES G. CHILD, M.D., professor of surgery, Tufts College Medical School. Philadelphia and London: W. B. Saunders. 1954. Pp. 444. 60*s*.

THE circulation through the mammalian liver is complicated by its dual blood-supply. This introduces many difficulties not only for the student of this circulation but for everyone concerned with hepatic disease. The great importance of the subject, however, has stimulated an enormous volume of research on many animal species, and by divers techniques. It is perhaps hardly necessary to say that the results of such a varied approach have been far from uniform, and often contradictory. The development of the various surgical operations for the relief of portal hypertension, however, has made necessary a better understanding of the problems, and has stimulated Professor Child to collecting into one volume the main contributions to this subject during the past fifty years. A series of six short appendices describe some of the experiments performed by the author and his associates; a seventh deals with the case-histories of patients subjected to various types of shunt operation for portal hypertension.

Students of the liver have long needed a book of this kind, and most of them will wish to thank and congratulate Professor Child. The illustrations are a credit to all concerned.

Preservation and Transplantation of Normal Tissues

A Ciba Foundation Symposium. Editors for the Ciba Foundation: G. E. W. WOLSTENHOLME, O.B.E., M.A., M.B.; MARGARET P. CAMERON, M.A., A.B.L.S. London: J. & A. Churchill. 1954. Pp. 236. 25*s*.

FROM the clinical viewpoint tissue storage is the provision and storage of spare parts for replacement surgery, and with few exceptions it entails the storage of tissues obtained from other human beings. Since the use of stored tissues is restricted by the fact that some living tissues will not form permanent grafts after transplantation a survey of the problems must take into account the problems of transplantation immunity reactions, leading to death of the graft. Appropriately, P. B. Medawar's opening contribution to this symposium refers particularly to skin homografts, and later F. K. Sanders describes the difference in behaviour between nerve homografts and nerve autografts. Endocrine homografts are dealt with by P. F. Jones and other contributors. A survey of general surgical problems of tissue transplantation by W. P. Longmire and his associates paves the way for detailed accounts of the surgical application of different tissues, both fresh and preserved, viable or non-viable. Two contributions describe the maintenance and operation of "tissue banks." Other articles of general interest deal with long-term storage of endocrine tissues and skin in a viable state, the preservation of blood, and biophysical aspects of freezing living cells. W. R. Earle describes the maintenance of long-term large-scale tissue cultures; Pomerat and Lewis, methods for the analysis of thermal stress; and P. J. Gaillard the transplantation of cultivated parathyroid tissue in man. This book does full justice to its title.

The Homosexual Outlook

A Subjective Approach. DONALD WEBSTER CORY. London: Peter Nevill. 1953. Pp. 326. 18*s*.

THE author of this book writes sincerely and responsibly about the effect upon his own life of a strong homosexual drive. He describes from direct observation the language and social habits of homosexuals in a large American city, and the personal and social conflicts they must encounter. Of the psychological aspects he gives a review influenced by his reading and his experience of psycho-analysis: he was treated by this method for a long time, and in consequence overcame his feelings of shame and remorse but not his homosexual impulses. He is convinced that psychological treatment cannot change a homosexual into a heterosexual, though it may enable him to marry happily while maintaining a homosexual attachment. Like most educated men and women who are homosexual, the author emphasises the advantages which he believes are conferred by homosexuality, and he names the famous men who are said to have been homosexual (his list includes Francis Bacon, Byron, and Shelley). His argument is, in the main, a plea for a minority—a minority who are, in his view, not so much in need of toleration or therapy as of acceptance and equal treatment, in the light of a reorientation towards sexual life in modern civilisation. He develops this argument with such candour and moral dignity that his book deserves close attention, even though its thesis is repugnant to many.

Pneumoconiosis Abstracts. Vol. 2 (London: Pitman. 1954. Pp. 517. 80*s*.).—This volume of abstracts, made and compiled by Dr. E. L. Middleton and reprinted from the *Bulletin of Hygiene*, brings us up to 1950. The abstracts are in general clear and precise. The collection is comprehensive and well arranged with a good index, and therefore forms a very valuable reference book; but it is a pity it costs so much.

Basis of Clinical Neurology (3rd ed. London: Baillière, Tindall, & Cox. 1953. Pp. 510. 54*s*.).—Prof. Samuel Brock's textbook, eight years older since the last edition, maintains its workmanlike tradition. Collaborators have revised sections, and contributed new material, on electro-encephalography, electromyography, electrodiagnostic methods, the visual pathways, cerebral angiography, sensory extinction, and double stimulation; and the whole book reflects the synthesising mind of its editor. As he says in his preface, neurology and psychiatry are drawing nearer to one another; and he believes that one day they will not only be inseparable but will speak the same language.

Medical Progress, 1954: *A Review of Medical Progress during 1953* (London: J. & A. Churchill. 1954. Pp. 345. 36*s*.).—This book, edited by Dr. Morris Fishbein, consists of essays on trends of research in many subjects, including cardiology, surgery, rheumatic diseases, the newer drugs, infectious diseases, gynæcology, reablement, physical medicine, and many other specialties. The contributors, authorities in their fields, make careful and critical surveys of work published during the year, endeavouring to distinguish as far as possible between work making a permanent addition to our knowledge and that which is still experimental; and they provide a guide to rewarding reading in the long bibliographies which end the chapters.

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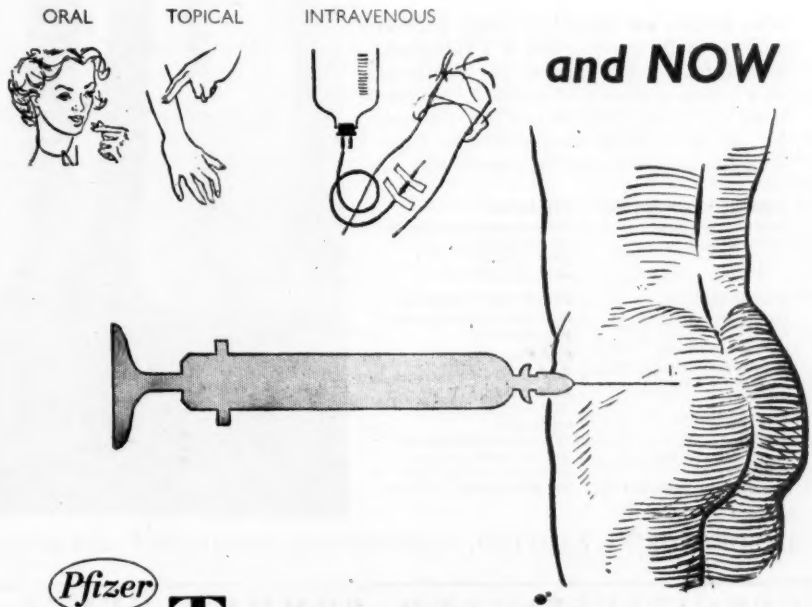

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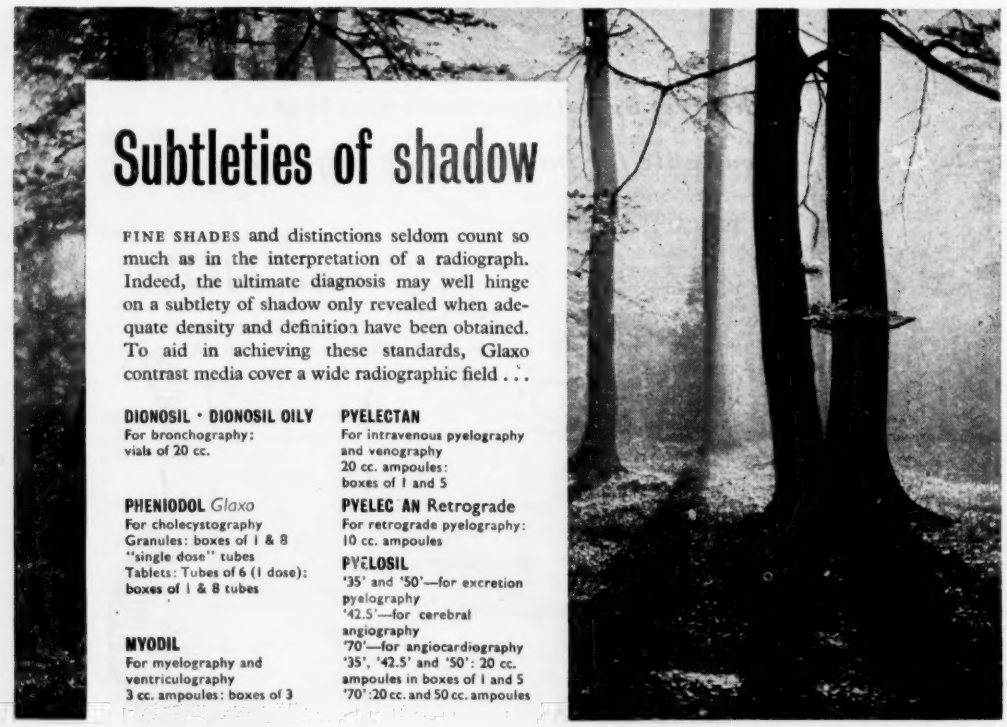

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THE LANCET

LONDON: SATURDAY, JUNE 26, 1954

Cortical Localisation

THE extension of neurosurgery beyond the relatively narrow bounds of tumour removal has given strong impetus to investigation into cerebral activity and cortical localisation. The development of psychosurgery, scar excision, topectomy, gyrectomy, and even hemispherectomy,[1] together with electrical stimulation of the brain at operation, have made it possible to apply to human physiology techniques previously restricted to research on animals. Paradoxically (but in keeping with experience in other fields of research) more direct and detailed knowledge has lessened the absolutism of theories on cortical localisation.

Discussing motor representation in the cortex, FULTON [2] asserted that "the controversy would seem clearly to be one which can be resolved more readily by recourse to experiment than by philosophical reflection." But the information from recent experimental work on the human brain is exceedingly complex and has given rise to argument and counter-argument in abundance; in WALSHE'S [3] words, "our knowledge has achieved a high degree of differentiation but yet awaits integration." The trans-oceanic debates of FULTON and WALSHE have been echoed by GOODDY [4] and JEFFERSON.[5] The details of these controversies are not identical, but in both the main schism relates to the parcellation of the cerebral cortex—to the notion that the cortex is or is not an anatomico-physiological mosaic. There is a spectrum of theories on the subject, at one edge of which are the earlier views of PENFIELD and RASMUSSEN,[6] whose famous gargoyles epitomise the absolutist concept. Their monumental industry, applied both to the interpretation of epileptic-seizure patterns and to the electrical exploration of five hundred brains, resulted in extremely detailed maps of cortical activity. Lately PENFIELD [7] has modified his ideas and has declared "that the function of the precentral gyrus is to transmit and no doubt transmute the impulses which reach it from the central integrating system . . . and if a homunculus is drawn it is no more than an aid to memory." At the other end of the spectrum is the view expressed by GOODDY and MCKISSOCK [4] that "there is not a standard brain with all functions set and localised for use. The brain stands ready for training." LASHLEY [8] emphasised the integrative relation between the "specialised" centres and the rest of the brain, and cast doubt upon the validity of the cyto-architectonic approach to localisation. Further, KALINOWSKY,[9] reviewing the results of selective cortical ablation, indirectly supports the idea of equipotentiality in asserting that at least in the prefrontal areas the intensity of the mental change appears to be determined by the quantity of pathways destroyed.

This divergence of views expressed by careful and responsible workers is bewildering. Are they in some way reconcilable? A clue seems to emerge from closer consideration of the techniques employed by the different theorists. It is not really surprising that the cerebral map produced by the histologist differs from that produced by the electrical stimulator: an analogy may be found in the differences between geological and ethnological cartography of the earth's surface. Again, clinical assessment of the diseased brain permits yet another equally valid interpretation of localisation, based on functional deficit. Finally, the results of ablation and of hemispherectomy, viewed against a temporal background in which improvement and even redesign of functional patterns takes place, indicate that there must be some equipotentiality of cerebral tissues. FULTON'S claim for the superiority of experiment to philosophy now seems rather less convincing: it is the interpretation of the integrated experimental results that is so important. In the first place the cyto-architectonic method is clearly valueless in localising function: it requires physiological corroboration. Furthermore, since the effects of strychninisation and of electrical stimulation in no way resemble normal cerebral activity, no firm deduction about localisation of normal function can be made from such techniques. In the face of this experimental confusion it is tempting to resort to clinical pragmatism, but one must beware of the fallacy of identifying the localisation of sign-producing lesions with the localisation of normal function. The apostles of BROCA would be confounded by the recent revelation that ablation of the third frontal gyrus in the dominant hemisphere fails to produce any aphasic symptoms.

Ablation and hemispherectomy may seem to offer means of gaining more precise information. If an area of brain tissue can be removed without disturbing a particular function, it is reasonable to suggest that this function is located elsewhere. The production of gross functional defect by removing a given area of the cortex is powerful prima-facie evidence that the area excised is related to the function lost. But this idea, however attractive, implies that the cerebral cortex is made up of independent nerve-cells, and neglects the complex interweaving of neurones and their dendrites. For if, as seems most probable, cortical function is mediated by interconnected neuronal circuits, ablation can produce its effects by interrupting a particular circuit at a relatively remote point without indicating exactly where function is initiated. Indeed the varying results of topectomy, and the preservation of some motor function after hemispherectomy, can best be explained in terms of variable neuronal patterns, possibly including bilateral connections. Such neuronal patterns could exhibit functional flexibility and allow for some degree of compensatory re-education. This concept in no way involves accepting the view that there is no localisation of function at all—"that all parts of the brain stand ready for training." There seems to be no training of new visual areas, and the residual motor function after hemispherectomy is only a crude parody of the fine movements controlled by an intact brain. Thus the weight of evidence,

1. Krynauw, R. A. *J. Neurol. Psychiat.* 1950, **13**, 243.
2. Fulton, J. Functional Localisation in the Frontal Lobes and Cerebellum. London, 1949.
3. Walshe, F. M. R. *Brain*, 1943, **66**, 104.
4. Gooddy, W., McKissock, W. *Lancet*, 1951, **i**, 481.
5. Jefferson, M. *Ibid*, p. 635.
6. Penfield, W., Rasmussen, T. The Cerebral Cortex of Man. New York, 1950.
7. Penfield, W. *Brain*, 1954, **77**, 1.
8. Lashley, K. S. *Arch. Neurol. Psychiat.* 1937, **38**, 371; *J. comp. Neurol.* 1946, **85**, 223.
9. Kalinowsky, L. B. *Arch. Neurol. Psychiat.* 1953, **69**, 582.

which is against a point-by-point localisation of function, nevertheless supports the notion of specialisation of certain cortical areas. We have in fact returned to the doctrine expounded by WALSHE,[3] who regards the "hand area" of the motor cortex as a macula of the field of hand movement. This idea is based on the earlier thesis of HUGHLINGS JACKSON[10] that the arm centre represents movements of all parts of the body, but particularly of the arm itself. Such a view would account for certain apparent contradictions in clinical interpretations of cortical localisation—particularly in relation to complex sensory auræ which appear to transgress the classical boundaries of sensory representation.[11] This concept is not simply of academic interest. The knowledge that less specialised areas can take over control in the event of injury to the functional maculæ is an encouragement to neurosurgeon and neurologist in the treatment of patients who have suffered cortical damage of any type.

Serum Hepatitis

PROGRESS in controlling the spread of infection with hepatitis viruses continues to be slow; for we lack a suitable animal host, culture medium, or specific laboratory test. Nevertheless the use of two more tedious methods—tests in volunteers (in the U.S.A.) and carefully controlled field observations (in Great Britain and the U.S.A.)—have thrown some light on the maintenance and transmission of serum-hepatitis virus in man. Three recent papers[12–14] have confirmed earlier suspicions, which had been strengthened by brief reports by the same workers, that there exists an undefined proportion of adults—possibly as many as 0·5% at some times in some places[15]—who, without ever having had symptoms or signs of hepatitis, carry in their blood an agent which will produce hepatitis when injected into others. The mechanism by which the virus is maintained has long been a puzzle; for the disease is transmitted nearly always—possibly always—by injection. An obvious possibility was transmission in utero; and the observations by STOKES and his colleagues[12 16] on a single mother and child, as well as several recent observations of acute and often fatal hepatitis in infants,[16–18] strongly support this hypothesis. How long virus persists after such infection is still undecided; but it has frequently been observed that in children and adolescents serum hepatitis, though no less severe than usual when it does occur, is relatively uncommon,[19 20] whereas infective hepatitis is commonest in these age-groups. Among blood-donors carriers of virus have been shown to be infective for several years,[12–14] the longest proven period being five and a half years. All these carriers were clinically healthy, although liver damage was demonstrated in some by liver-function tests and biopsy. Of 14 donors[13] found to be carriers, only 1 subsequently developed clinical hepatitis. Eight months after this patient recovered clinically, transfusion of his blood led to fatal hepatitis in another patient. A few previous experiments had failed to demonstrate persistent carriage after the clinical disease, but this catastrophe supports the contention that a past history of jaundice precludes donation of blood, except in an emergency. How best to prevent such accidents is still uncertain: NEEFE et al.[13] suggest that donors should be submitted to two or three liver-function tests; but they admit that some carriers give normal results, and some patients with diseases other than hepatitis give abnormal results. In Britain such a plan has been considered several times, but deemed impracticable.

In the late war, in addition to blood for transfusion, there was a need for large quantities of a stable substance for transfusion, easy to transport and store in any part of the world. Out of this arose the method of freeze-drying plasma from pools derived from 50 to 1000 or more donations of blood. By the end of the war it had become apparent that this method seriously increased the chances of disseminating the virus. In the U.S.A. the problem was attacked by seeking physical or chemical methods of treating whole blood or plasma, to inactivate virus. The hepatitis viruses had already been proved extremely resistant to heat at the highest temperatures that would not involve change in the constituents of the serum or plasma, and to the usual preservatives such as phenol and tricresol.[15] Each treated substance had to be tested on small groups of volunteers. Progress was slow, and the difficulties of reaching conclusions and relating these to large-scale production was shown by the work with ultraviolet light (U.V.L.).[21 22] In Great Britain the first step was to reduce the size of plasma pools to one where the risk would be relatively slight; each pool was restricted to 8–10 donations, yielding four or five 400-ml. bottles of plasma. The wisdom of this measure was evident from a survey of its application in the period October, 1945, to March, 1948.[23] When, however, the early successful results from the use of U.V.L. treatment were reported from the U.S.A.,[21] it was thought advisable to see whether this provided any further protection; and a preliminary account of a comparative trial of U.V.L.-treated large-pool plasma (600–800 donations), small-pool dried plasma, and whole blood is given on p. 1328 of this issue. Use of small-pool plasma has been clearly vindicated. What is even more gratifying is the drop in incidence of serum hepatitis among those who received whole blood or small-pool plasma in 1952–53, compared with the 1945–48 series[23]; parts of the two series were in the same area. This incidence is also very much less than that reported in recent years from the U.S.A. after transfusion of blood or plasma. Any of several different factors may underlie this reduction, but none can be established.

10. Selected Writings of John Hughlings Jackson, edited by James Taylor. London, 1931; vol. 1, p. 69.
11. Petit-Dutaillis, D., Chavany, J. A., Pertuisset, B., Lobel, G. *Pr. méd.* 1953, **61**, 429.
12. Stokes, J., Berk, J. E., Malemut, L. L., Drake, M. E., Barondess, J. A., Bashe, W. J., Wolman, I. J., Farquhar, J. D., Bevan, B., Drummond, R. J., Maycock, W. d'A., Capps, R. B., Bennett, A. M. *J. Amer. med. Ass.* 1954, **154**, 1059.
13. Neefe, J. R., Norrie, R. F., Reinhold, J. G., Mitchell, C. B., Howell, D. S. *Ibid*, p. 1066.
14. Murray, R., Diefenbach, W. C. L., Ratner, F., Leone, N. C., Oliphant, J. W. *Ibid*, p. 1072.
15. World Health Organization, Expert Committee on Hepatitis. *World Hlth Org. techn. Rep. Ser.* 1953, no. 62.
16. Stokes, J., Wolman, I. J., Blanchard, M. C., Farquhar, J. D., Drake, M. E. *Amer. J. Dis. Child.* 1951, **82**, 213.
17. Bodian, M., Newns, G. H. *Arch. franç. Pédiat.* 1953, **10**, 169.
18. Dible, J. H., Hunt, W. E., Pugh, V. W., Steingold, L., Wood, J. H. F. *J. Path. Bact.* 1954, **67**, 195.
19. Oliphant, J. W., Gilliam, A. G., Larson, C. L. *Publ. Hlth Rep., Wash.* 1943, **58**, 1233.
20. Brightman, I. J., Korns, R. F. *J. Amer. med. Ass.* 1947, **135**, 268.
21. Blanchard, M. B., Stokes, J., Hampil, B., Wade, G. R., Spizizen, J. *Ibid*, 1948, **138**, 341.
22. James, G., Korns, R. F., Wright, A. J. *Ibid*, 1950, **144**, 228.
23. Lehane, D., Kwantes, C. M. S., Upward, M. G., Thompson, D. R. *Brit. med. J.* 1949, ii, 572.

A further method of dealing with plasma has been suggested by ALLEN et al.,[24 25] in Chicago, who point out that all the present methods of storage tend to preserve any virus present, and that viruses in general tend to die more rapidly in the liquid state at room temperature (21°–30°C). They also dispute the common assumption that proteins in the plasma undergo early and serious deterioration, and they claim that plasma which has been stored for six to nine months at room-temperature is satisfactory for preventing or treating shock or hypoproteinæmia. ALLEN and his colleagues used pooled plasma from 25–32 donors, and found that 4% of their pools were contaminated (presumably with bacteria or moulds). Bacterial contamination would seem to be one of the main hazards of such material. Additional refinements of filtration and treatment with U.V.L. (neither of which was applied by ALLEN) have been suggested as useful adjuvants; but these measures seem to be just as laborious as preparing small-pool plasma. The Chicago workers claim that they have greatly reduced the risk of hepatitis from plasma by storage for six months at room temperature, and this agrees with the results from a questionary completed by 124 blood banks which had used the method; butthe Chicago workers' own results in 1942–53 are not so convincing. From the article that we publish this week it seems that in this country such material is unlikely to carry less risk than small pools (dried) as normally prepared here. Furthermore, MURRAY [26] has recorded hepatitis with jaundice in 1 of 5 volunteers who received only 1 ml. of a known infected pool which had been left for six months at room temperature.

Though there is still no certainly effective method of treatment which is harmless to blood or man, one can feel relatively safe in Great Britain when administering fresh whole blood, or plasma prepared from pools of 8–10 donations. These carry about the same risk—a risk that is very small indeed.

Certification

SINCE well over half the patients admitted to our mental hospitals now enter voluntarily, the stigma of mental illness is evidently fading. This wide acceptance of voluntary treatment shows, too, that the stigma attaches not so much to treatment in a mental hospital as to legal and compulsory detention in a mental hospital—to judicial certification, in fact. This point was brought out by witnesses from the Ministry of Health and the Board of Control who recently gave evidence to the Royal Commission on the Law relating to Mental Illness and Mental Deficiency.[27] It is possible, though not perhaps probable, that as enlightenment spreads, and mental illness in general is regarded with more equanimity, the stigma attaching to certification, too, will fade. But at present, at all events, the public think of the patient under certificate as "really mad," whereas they assume that a voluntary or temporary patient is suffering merely from some mild aberration or nervous breakdown. Again, certification of a member of a family may harm the employment prospects of other members—and of course the prospects of the mentally sick man himself, when he recovers. Since recovery often takes place in a matter of months, certification must often appear to patients as an unwarranted and damning piece of aggression by society. No other sick person is penalised in quite the same way. One method of changing the public attitude to certification would be by gradual education; but a quicker way, favoured by the Ministry and the board, would be to admit all patients to hospital without a judicial certificate, and only later to certify those whose dangerous or self-punitive impulses had not been modified by treatment. At present even a voluntary patient must apply in writing to be admitted to a mental hospital, though if he needed treatment in a general hospital his family doctor would arrange it for him. His admission, moreover, is notified to the Board of Control, which makes the whole undertaking seem more formidable than it is. Whatever virtue or value there was at the outset in such notification, the witnesses were agreed that it has now evaporated, and that voluntary patients ought to be able to use their mental hospitals with as little formality as they do a general hospital.

When a patient is unable to say whether he is, or is not, willing to accept mental-hospital treatment, the law already provides that he may be admitted without certification as a temporary patient.

The application is made by the spouse or other near relative, and is supported by the recommendation of two doctors, and these documents constitute authority for the detention of the patient up to six months, provided he does not in the meanwhile recover the power to express his willingness or unwillingness to remain. If towards the end of the six months it seems probable that he will not recover before the time runs out, but that he may do so soon afterwards, the period may be extended by two further periods of three months; and if then he still needs treatment, and is unable or unwilling to agree to remain as a voluntary patient he must either be certified or discharged.

This is a tried and valuable way of postponing certification for a patient who has lost his volition; but of course such patients are few, and their situation is very different from that of the patient who objects strongly to being detained in hospital. When it is obvious to everybody except the patient himself that it would be a good thing for him to have treatment in hospital, should it be possible, Mr. ARMER asked at the hearing, to force him—without a judicial order—to have it? And he answered, for the Ministry and the board, that, on balance, they thought it ought to be possible—that indeed it is highly desirable, both for him and his relatives, that he should be able to have treatment for a temporary period (say six to twelve months) without being certified. It could be done, Mr. ARMER suggested, by arranging for the unwilling patient to be taken to hospital by the duly authorised officer, under section 20 of the Mental

24. Allen, J. G., Inouye, H. S., Sykes, C. *Ann. Surg.* 1953, **138**, 476.
25. Allen, J. G., Enerson, D. M., Barron, E. S. G., Sykes, C. J. *Amer. med. Ass.* 1954, **154**, 103.
26. Murray, R. *Ibid*, 1954, **155**, 13.
27. Minutes of Evidence, first day. H.M. Stationery Office, 1954. Pp. 69. 3*s*.

The members of the commission are Lord PERCY OF NEWCASTLE (chairman), Mrs. H.A. ADRIAN, J.P., Mr. C. BARTLETT, R.M.N., Mrs. E. M. BRADDOCK. M.P., Sir RUSSELL BRAIN, P.R.C.P., Sir CECIL OAKES, J.P., Dr. T. P. REES, Dr. D. H. H. THOMAS, Dr. J. GREENWOOD WILSON, and Miss H. M. HEDLEY (secretary). The Ministry of Health and the Board of Control were represented by Mr. I. F. ARMER, deputy secretary of the Ministry and chairman of the board, Mr. H. R. GREEN, legal senior commissioner of the board, and Dr. W. S. MACLAY, medical senior officer of the board, and a principal medical officer of the Ministry.

Treatment Act, or a modified form of it, and kept there for three to seven days. His detention beyond this time would depend on medical recommendation, which instead of operating for fourteen days as it does with the present reception order would last for up to six months. It could perhaps then be extended for a further six months, thus delaying judicial certification for twelve months in all. Whether a person should be deprived of his liberty for twelve months merely on medical recommendation needs careful thought of course; but the Ministry and the board are convinced that on the whole it would be more to his advantage, and that of his relatives, than is immediate certification.

Such delayed certification, as Mr. WOODLEY reminds us in the correspondence columns, is already being tried in Northern Ireland, apparently with good success.

As a means of admission to a mental hospital, judicial certification has been abolished there, all patients being admitted as either voluntary or temporary patients. The application for admission of a temporary patient must be made to the medical superintendent by a relative, or—if no relative is available—by a welfare officer, and must be supported by a recommendation from one doctor, who must give reasons why he thinks the treatment necessary. The patient is admitted on these documents, and the initial period of temporary treatment may last twelve months. It may be extended, however, on application to the Northern Ireland Ministry of Health and Local Government, for two further periods of six months, and in exceptional circumstances a further extension is possible—over two years, in all. If, however, the patient is then thought to be unlikely to recover, and further mental hospital care is needed, a judicial order must be obtained.

It seems entirely reasonable that a patient should not be certified until he has had a period of skilled treatment, and that it should only take place when he has been for some considerable time in a mental hospital under psychiatric observation. As Mrs. BRADDOCK put it, "certification for a mental complaint should be the last resort, not the first."

Annotations

H.M. OVERSEA CIVIL SERVICE

TODAY many countries are moving steadily towards self-government. They do so with the good will and help of the Colonial Office and the Colonial Service. And it is a sign of this good will that all are anxious to ensure that such skilled help should continue to be available to these young governments.

Today all those who govern have to lean heavily on the expert, and the people who are called to govern these rapidly developing countries face enormous technical problems, with very few doctors, engineers, scientists, or administrators of their own; and, as the leaders in these territories themselves recognise, their need for British experts will remain for some time to come. The undertaking lately offered by Nigerian delegates shows [1] that these new countries are aware of their responsibility towards the men and women whose help they seek. But the Secretary of State for the Colonies feels that he too shares the obligation to safeguard the legitimate interests of these officers who were appointed under his name. To meet this changing situation he has, in a white-paper, described his plans for the *Reorganisation of the Colonial Service*.[2]

Since 1930 the members of this service have been employed and paid by the government of the territory where they worked, but they have been under the "general direction and patronage" of the Secretary of State for the Colonies. If the territory where they are working becomes self-governing, these officers, the white-paper suggests, are entitled to expect that the terms of service offered them shall not be less favourable than their present ones; that their pensions and other benefits shall be safeguarded; that they shall be eligible for transfer and promotion to posts in other territories; and that if their employment is ended because of constitutional changes they shall be given adequate notice and alternative employment or compensation. The Government in the United Kingdom is prepared to secure them these rights by formal agreement with any country which attains self-government, and as a first step the Government is compiling a list of all the officers entitled to these rights, and giving them the new name of Her Majesty's Oversea Civil Service. Those eligible for admission to the new service will include members of the Colonial Service (including the Colonial Medical Service). In future any offer of appointment made by, or on behalf of, the Secretary of State will include a clear statement whether it carries with it membership of the new service or whether the officer's contract is solely with the territorial government. The Government hopes that "this new form of service will ensure that qualified men and women may be attracted to come forward in future as in the past, in a spirit of confidence, enthusiasm and partnership, to help the oversea governments and peoples along the path of social, economic and political progress."

1. *Lancet*, June 12, 1954, p. 1249.
2. Colonial no. 306. H.M. Stationery Office, 1954. Pp. 7. 4*d*.

GENETIC PREDISPOSITION TO DISSEMINATED SCLEROSIS

WHEN the genetic predisposition to an illness is weak its existence can be tested in two ways. Careful twin studies may reveal greater concordance of identical twin pairs, compared with fraternal twin pairs; or large-scale family studies may show that the disease prevails in the near relations of the index cases at a rate definitely higher than in the general population.

No major twin studies have yet been made for disseminated sclerosis. Thums [1] in 1949 found 1 of 20 identical twins also affected. This indicates that genetic predisposition, if present at all, must be weak. Four family studies have each given essentially similar results, though the workers have differed in the interpretation of their findings. Curtius and Speer [2] were the first to publish figures suggesting that near relations are unduly liable to be affected. Subsequently Pratt [3] found 6 of 609 siblings and 7 of 1441 parents affected. Müller [4] in Sweden last year and Allison and Millar [5] this year have reported much larger series. Müller studied the families of 750 index cases and found 5 of 1493 parents, 22 of 2815 siblings, and 4 of 692 children affected. After correction for age he calculated that these figures represented incidences of 0·3, 1·0, and 2·3. Allison and Millar studied every case they could find in Northern Ireland—700 in all (476 "probable," 145 "possible," and 79 "early")—and in 2939 siblings they found 34 affected (about 1%). They also found that the highest incidence in the general population for any area or age-group (County Fermanagh, aged 40–59) was only 0·18%.

1. Thums, K. Cited by Pratt (footnote 3).
2. Curtius, F., Speer, H. *Z. ges. Neurol. Psychiat.* 1937, **160**, 226.
3. Pratt, R. T. C. *Ann. Eugen., Lond.* 1951, **16**, 45.
4. Müller, R. *Arch. Neurol. Psychiat.* 1953, **70**, 731.
5. Allison, R. S., Millar, J. H. D. *Ulster med. J.* 1954, **23**, suppl. 2.

Thus it is generally agreed that the proportion of siblings affected is about 1%—though the risk of a sibling developing the disease is probably rather higher than this when allowance is made for age and for the degree to which the probability of ascertainment is independent of the number of affected individuals in the family. The risk to parents and children is probably of the same order. But these figures mean little except in comparison with the risk to a random member of the general population, and this risk is less well established. Müller alone of these workers felt that the incidence he found in near relations might not differ significantly from that in the general population; but he was not aware at the time of the findings in Northern Ireland. While this general risk no doubt varies from country to country, it seems unlikely to exceed 0·2%. Therefore the risk to near relations is probably at least five times greater than that to others.

There are several possible explanations of these findings besides the obvious one that genetic factors predispose (though rather weakly) to disseminated sclerosis. One is common environment; but this is unlikely to extend over three generations. A more probable explanation is that the familial cases may have been, not disseminated sclerosis, but some form of genetically determined spino-cerebellar ataxia. The workers concerned were all aware of this possibility (Allison and Millar show that the figures for the "probable" cases do not differ from those for the whole group), and they agree that differential diagnosis may be difficult.

ACCIDENT-PRONENESS IN MINERS

A NOT wholly unattractive picture of the accident-prone was drawn for us in 1943 by Flanders Dunbar.[1] She found them unusually healthy, seldom off work, lively-minded, happy-go-lucky, agin the government, and inarticulate about their feelings. Since she wrote about them, however, some doubt has been thrown on their existence. They are, in any case, difficult for statisticians to lay hands on, for after an accident anyone—accident-prone or not, and whether from choice or necessity—may change his job. However, as we have noted,[2] some clinicians are inclined to think that temperamental qualities do affect liability to error, and so to accident. Mr. J. W. Whitfield[3] in an investigation which should mollify the most exacting of statisticians, has studied disabling accidents in one colliery between July 1, 1944, and Dec. 31, 1946, and has drawn some conclusions based on an actuarial risk, calculated for each man according to the number of shifts worked, the place of work, and the type of work done. Discrepancies between calculated risk and actual accident experience were analysed, and accident-proneness demonstrated: that is, there were measurable individual differences in accident susceptibility.

Men who had worked in the mine for only a short time were excluded from the study. That left 1384 miners who, during the period covered, suffered 1265 accidents severe enough to keep most of them from earning full wages at their normal work for more than three days. Some accidents, presumably, are unavoidable: if a thunderbolt strikes one, or the earth abruptly swallows one up, no amount of resource and sagacity, no expertness in motor response, is likely to preserve one from damage. Such catastrophes apart, however, accidents can be considered, in Whitfield's phrase, as "failure to make an adequate response to a hazardous situation." We may fail either because we do not appreciate the hazard in time and decide what response to make, or because we do not make the appropriate response quickly enough. Such failures in appreciation and in performance can be demonstrated by appropriate tests, and the accident-prone men in Whitfield's study gave poor scores in one or other of the two groups of tests. The type of accident-proneness differed with age. The younger accident-prone miners were heavier and of better physique than their contemporaries, and their motor control and coördination were good; but they scored very poorly on tests of perceptual, memory, and cognitive processes The older accident-prone men, on the other hand, scored average or above average in the perceptual and cognitive tests, but were much poorer in motor control and coördination. Perhaps the younger accident-prone leave this industry before they reach middle age: or perhaps they learn to keep out of trouble.

In the older men, accident-proneness may have been slowly developing as motor ability declined; and perhaps perceptual and cognitive ability were declining too. A man who is deficient in motor ability commonly compensates for this by anticipation, but as age advances he may become less able to do this. Whitfield suggests that if further studies confirm his findings, the "older type" of accident-proneness might be watched for and detected early. Methods could then be devised to protect those in whom it was developing. Accidents are undesirable, in the interests not only of the men but of the industry: the older men are of great value, and the loss of their skill, even temporarily, is serious. The younger accident-prone present a different, and more difficult, problem. Whitfield found some evidence that their temperamental development might have been unfavourably affected by adverse factors in childhood and upbringing, but, as he rightly says, "this is not susceptible to direct action by the industry." The proper way of tackling them, he concludes, is by training: for though it may be impossible to teach caution to those who are temperamentally careless and happy-go-lucky, yet they can be taught to use specific working methods appropriate to their lack of foresight. It will be something, he thinks, if safety officers recognise that good motor coördination alone is not enough.

HEEL LESIONS IN RHEUMATOID ARTHRITIS

IT is well known that in rheumatoid arthritis the distribution of the joint lesions spreads centripetally as the disease progresses, but in the early stages only the hands and feet may be affected. For early diagnosis, therefore, attention is particularly directed to the hands, which show characteristic changes; in the feet early lesions are perhaps less easily recognised, and the changes produced in the tarsus by rheumatoid disease less well known.

Bywaters[1] has described heel pain as an early or even a presenting symptom in rheumatoid arthritis, and has reported a small series of cases in which he investigated the underlying lesions. He found two different heel lesions, occurring with about equal frequency, and usually together, in 2–3% of unselected cases. The first, a sub-Achilles bursitis, involves the bursa which lies between the tendon near its insertion and the fibrocartilage of the posterior surface of the calcaneum. It is manifested clinically by swelling, pain on walking, and tenderness, and radiographically by rarefaction and erosion of the subjacent bone. The second lesion consists solely in erosion of the plantar surface of the calcaneum, involving the plantar spur and the area behind it. In both lesions the histological appearances of rheumatoid granulation-tissue are found, including the cell formations typical of the rheumatoid nodule. Healed lesions examined at necropsy showed obliteration of the sub-Achilles space and loss of normal fibrocartilage from the bone surface at the site of erosion.

1. *War Medicine*, 1943, **4**, 1. See also *Lancet*, 1952, i, 1296.
2. *Lancet*, 1953, i, 730.
3. *Brit. J. industr. Med.* 1954, **11**, 126.

1. Bywaters, E. G. L. *Ann. rheum. Dis.* 1954, **13**, 42.

The type of heel pain to which these lesions give rise includes the "achillodynia" described many years ago, and hitherto regarded as a complication of chronic infection—usually gonorrhœal. Bywaters believes that rheumatoid arthritis may be the commonest cause of these lesions, and that this diagnosis should be especially kept in mind when heel pain is among the presenting symptoms.

RECEPTION HOME

> "There are several doctrines about reception homes: the approach psychometric; the approach analytical; and the approach nihilistic, the last displayed by those who claim to have opened such homes and closed them again. Perhaps more precious than any is our own pose of being plain honest-to-goodness social workers. That child, we say, is best served by the reception home who never goes into it."

IN *Case Conference*, a new journal for social workers and administrators, Mr. Kenneth Brill,[1] from whom we quote above, describes the achievements of a reception centre during its first year of life, and with pleasant irony tells something of the strength and weakness of social work in this setting. The aim of the staff is to get the children who come into the centre either safely back to their mothers or else into a settled home life with someone who will take the mother's place; and their results speak for themselves: of 47 children under the age of fifteen who came into the centre during the year ending March, 1953, 35 have since been restored to their families, 6 are in foster-homes, and 6 are still in group care.

The children come into the centre for the usual reasons—on a "place of safety" order, because of temporary difficulty at home (such as admission of the mother to a mental hospital or sanatorium), because the family has been evicted, or because they have been committed to care by a court, for delinquent behaviour. The first thing they notice is that they have not come to a permanent haven: they see other children coming and going, and they probably derive a feeling of safety from the fact that they are all in the same boat—temporarily away from a home to which they hope to return. This helps them to accept the situation and look forward to a coherent plan for the future; and they are quite aware of what is going on, it seems.

> A boy of ten, committed by the juvenile court for larceny, and rejected by his mother, got tired of waiting in the home, and accosted the boarding-out officer with the inquiry, "When are you going to make a plan for me?"

A child who has led a roving life with an evicted parent is sometimes at a loss to see why he should change his arrangements. They have, as far as he can see, worked fairly well, and they have, at all events, generally supplied him with an independent spirit. An eleven-year-old, sounded on the question of a foster-home, replied maturely: "I don't want to live with any stinking auntie, whatever the Government wants."

The results achieved by this reception centre form part of the experience of the Devon Children's Committee, which set it up. The county as a whole can claim that of 233 children under fifteen who came into care in the year ending March, 1953, only 20 remained in institutions a year later. Children for whom the committee foresee the end of their stay in care (classed as short-stay children) are now nearly all sent into foster-homes from the start; and, in particular, admission of short-stay children to a residential nursery has almost ceased. There were 132 short-stay children among the 233, and all are now back in their own homes. Moreover, nearly half the long-stay children, whether committed by the courts or not, went home within two years, and two-thirds of the remainder are now in foster-homes.

This first year's experience, Mr. Brill says, contains an administrative lesson. Nowadays children's committees are urged to invest in plenty of qualified child-care officers; and those who do so will be surprised at the dividend. The chief gain—which is both spiritual and financial—is that only a tiny fraction of the children received ever need to be in residential care: residential nurseries and family homes can be closed down. "Invest," he says, "in bricks or mortar or in properly trained social workers, but not in both at once."

The reception home has proved to be a terminus for several lines of social work; and, since some twelve statutory agencies [2] have an interest in protecting children from neglect and ill-treatment (quite apart from the children's officer, her field worker, the staff of the reception home, almoners, police, probation officers, private people such as doctors and clergy, and all the voluntary agencies), Mr. Brill advises those who are opening such homes to have a room large enough to take twenty or more social workers at a time at a case-conference. Fortunately few families attract the interest of more than six or eight agencies; but representatives of all these must be present at the case-conference, or else—as he illustrates from an authentic case—the one forgotten agency will take independent action astonishing to the rest. The difficulty, he says, is in forecasting which agencies to invite. Nevertheless the justification of such gatherings lies in the experience of children now back with their families or beginning a new life in foster-homes.

1. *Case Conference*, May, 1954, p. 12.

SURVIVAL OF DRIED CULTURES

BACTERIA survive for long periods in the dried state, and drying under controlled conditions is now a standard method for maintaining stock cultures for teaching or reference purposes. The techniques used may be simple or complex, but all involve the destruction of 90–99% of the organisms being dried. In September, 1953, the British Commonwealth Collections of Micro-organisms organised a discussion of drying methods to which workers from different parts of the Commonwealth were asked to contribute their experiences. Papers circulated before the meeting are included in the report of the discussion,[3] which ranged from the problems of the designer of apparatus to the technical methods for checking the viability of the dried cultures.

The discussion showed that the fundamental principles underlying the method are still only imperfectly understood and that many of the procedures are empirical. The most important single factor affecting viability of the dried product seems to be the material in which the micro-organisms are suspended, and of glucose, the addition of which was first suggested by Fry and Greaves,[4] is the most successful of the additives. Record and Taylor [5] have recently shown that bacteria themselves, presumably by autolysis, can contribute some protective factor, so the survival-rates of heavy suspensions are greater than those of lighter suspensions, but the difference is not as great as the glucose effect. Ultimately it may be possible to correlate survival-rates with residual moisture content, but technical difficulties of determining residual moisture have so far prevented this. Apparatus described at the discussion may bring moisture determination within the range of routine procedures.

2. Home Office Circular no. 157, 1950.
3. British Commonwealth of Nations Scientific Liaison Offices, B.C.S.O. (London): A discussion on the maintenance of cultures by freeze drying. H.M. Stationery Office. Code no. 88–1311. 5s.
4. Fry, R. M., Greaves, R. I. N. *J. Hyg., Camb.* 1951, **49**, 220.
5. Record, B. R., Taylor, R. *J. gen. Microbiol.* 1953, **9**, 475.

Special Articles

NEGLIGENCE

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WITHIN recent times the number of actions against hospitals has increased. For this increase there appear to be four main reasons: (*a*) the payment of doctors from public funds, (*b*) the national ownership of hospitals, (*c*) the effects of the Legal Aid and Advice Act, 1949, and (*d*) certain changes in the outlook of the doctors themselves.

In the days when the consultant staffs of voluntary hospitals were unpaid, the fact that their service was gratuitious made them as immune against charges of negligence, in fact though not in law, as the barrister is today. The practice of bringing actions against hospitals may be said to date from the beginning of public ownership of hospitals, when certain of the poor-law hospitals and institutions "appropriated" by the local authorities in 1930 took on the functions of general hospitals; and it advanced further when the ownership of hospitals was taken over by the State in 1948, since when neither the public nor their legal advisers have hesitated to bring actions against members of the medical staffs—knowing that behind them are virtually unlimited resources. (Also the fact is not unknown to the public that all prudent doctors are insured against actions through one of the medical defence societies.) Under the Legal Aid and Advice Act, 1949, any man with a reasonable cause for action can be given the means of seeking a remedy, and State funds are now available even for action against the State. And finally the medical profession no longer appears united, presenting an impenetrable front. Some doctors do not hesitate to take sides in the lay press, and the medical press is a happy hunting-ground for the journalist. The serious effects of conflicting evidence by expert witnesses will be referred to later.

NEGLIGENCE IN LAW

Negligence may be of two kinds, criminal and civil. Criminal is distinguished from civil negligence in that in the former the degree of negligence must be a criminal one; it must be a *wicked* negligence, or negligence which shows so little thought for the safety and life of others that it merits punishment, while in the latter damages are sought from the wrongdoer to recompense the sufferer. Whereas the degree of negligence which will support a claim for civil negligence may not be sufficient to constitute criminal negligence, the degree sufficient to amount to criminal negligence will be more than enough to support the civil kind. A charge of criminal negligence does not preclude the instituting of civil proceedings on the same facts.

In common law civil negligence is a tort, defined as a civil injury or wrong, the remedy for which is unliquidated damages—i.e., damages which are not ascertained previously but are left to the court to determine in its discretion. (There are of course other remedies for a tort, such as an injunction; but they are in addition to the damages, and do not apply to negligence.) It has been said that a tort is "a civil wrong for which the remedy is a common law action for unliquidated damages, and which is not exclusively the breach of a contract or the breach of a trust or other merely equitable obligation,"[1] but the same facts might give rise to a tort and also to a breach of contract, for the doctor-patient relationship is usually one of contract. Nevertheless when there is a breakdown in this relationship owing to some malfeasance on the part of the doctor it is generally under the heading of tort that a claim is made.

Negligence, as a tort, is the breach of a legal duty to take care which results in damage, undesired by the defendant, to the plaintiff.[2] It consists, therefore, of three elements, and it is only if these three exist together that an action for negligence can arise. They are (*a*) a legal duty to take care, (*b*) a breach of that duty, and (*c*) damage arising from the breach.

(*a*) No problem arises with regard to the duty of care, because it is obvious that the doctor-patient relationship involves this duty.

(*b*) Speaking generally, a breach of duty is the omission to do something, or the doing of something which should not be done by a reasonable man, and in this context a reasonable man is generally taken to mean the ordinary man in the street. However, where members of a profession hold themselves out as exercising particular skill, this must be of the order which can reasonably be expected from members of such profession, having regard to the knowledge of the time. A doctor will be as liable if he renders treatment voluntarily to an unknown person in a street accident which he encounters merely when passing, and is negligent, as he would be if treating one of his regular patients, except that the circumstances in which he is compelled to work will, of course, be taken into account. Whether or not there has been a breach of the duty of care is a question of fact for the jury to decide, or for the judge should he be sitting without a jury.

There are no degrees of quality in civil negligence, and although such terms as "slight," "moderate," and "gross" may be used they have no bearing on whether or not negligence exists.

(*c*) The result of the breach must be damage to the sufferer. If there is no damage there can be no negligence. The object of an action for negligence, therefore, is to obtain damages for the plaintiff for a wrong suffered—not to punish the defendant. There are, however, other possible results of such an action and they will be discussed later.

In passing it should be mentioned that an action for negligence is one of the remedies for breach of a statutory duty. The damage suffered must be that which it was the purpose of the statute to avoid and not other damage resulting from the breach. It will be interesting to see whether there are any developments along this line in future, relative to the statutes, said to number about 180, which now have some bearing on the practice of medicine.

THE CONDUCT OF A CASE

The case may never reach the courts. The negligence may be admitted, the amount of damages may be agreed between the parties, and after settlement the matter may end without publicity, the whole business being conducted privately between the parties and their representatives. Even when a writ has been issued against the defendant, the matter may be settled by the parties before the action comes up for trial.

On the other hand, though the defendant may admit negligence, and may be willing to pay what he thinks is a reasonable amount as damages, the injured party may regard the amount as insufficient. The case is then taken to the court for an assessment of damages, and perhaps (if more than one person has suffered) for an apportionment.

1. Salmon, Law of Torts, 1953, p. 15.
2. Winfield, Law of Tort, 1950, p. 405.

If negligence is denied, the object of the action is to decide whether there was negligence. If the case is proved, damages will be assessed. The burden of proving negligence rests on the plaintiff, and he must prove not only that the defendant was negligent but also that this negligence caused the injury.

There are, however, cases where, though the plaintiff can prove that an accident has happened, he cannot prove how it happened, and consequently cannot show that it was due to the negligent act of the defendant. There are many acts which, performed in the normal way, lead to no untoward happening; and in which, should anything go wrong, it might be presumed that it was due to the fault of the person in charge of or performing the act. This has given rise to the rule of *res ipsa loquitur*. If the accident speaks for itself, the plaintiff does all that is required of him if he proves the event, and it then becomes the duty of the defendant to show that it was not due to negligence on his part. If, however, the defendant can show that the accident could have occurred either by his negligence or without negligence the burden of proof moves once more to the plaintiff to show that it was due to negligence.

A case is proved or disproved in the courts by means of evidence, which was defined nearly two hundred years ago as "that which demonstrates, makes clear or ascertains the truth of the very fact or point in issue, either on the one side or on the other."[3] There are three types of evidence:

(i) Oral evidence—i.e., the testimony of witnesses.
(ii) Documentary evidence—i.e., the production of documents.
(iii) Real evidence—i.e., the inspection of things.

(i) *Witnesses* may be of two kinds. Firstly, there is the ordinary witness of fact who makes a statement of fact and gives no opinion on it. Thus a man in the street may say that he saw a man fall from a roof, and when he picked him up he found that he was unconscious and had a large cut over the top of his head. Secondly, there is the expert witness who may give evidence of fact and follow this up with an opinion. If, for example, the man who fell from the roof was taken to a hospital, the medical officer may say that he saw the man on admission, that he was unconscious, and that he had a large cut over the head. Treatment was given and the patient put to bed in a ward where he died in half an hour. These are facts; but the doctor may say in addition that in his opinion death was due to compression of the brain due to hæmorrhage, following injury to the head. He then becomes an expert witness. Alternatively the expert witness need not give evidence of facts before giving his opinion on them, but may give his opinion on facts which have been established by others. He may, for example, apply his special knowledge and experience to the facts already known to the court. Normally it is for the court to form opinions from facts given by witnesses but when the court cannot form an opinion because the subject is technical, or because special study or skill is required, then experts may be called.

(ii) The production of *documents* means the production before the court of any written or inscribed matter relative to the case. The term is used in its widest sense to mean anything permanently recorded, and includes hospital and doctors' notes of cases. Privilege, in the sense that they contain information of a confidential nature which was obtained in a professional capacity from patients, is not attached to these notes, the production of which can be ordered by the court. If, however, their production would tend to criminate the person producing them, then privilege may be claimed.

(iii) The term "*things*" means anything other than documents as defined above. Thus there may be produced in court the splint used in a particular case, or an anæsthetic machine may be brought as an exhibit to explain how it works. In the case of documents and things, witnesses usually come forward and testify about them either as to fact or in an expert way.

3. Blackstone. Comm. III. 367.

A plaintiff or defendant is under no obligation to engage a lawyer to advise him and to look after his interests, or to represent him in court; but in almost all cases litigants are represented, and today there is no reason why any person with a reasonable case—this term is used to eliminate frivolous and vexatious actions—should not have legal assistance, however poor he may be.

Where he is engaged, counsel's duty is to further the interests of his client by bringing before the notice of the court all the facts which, with fairness, will support his client's case. Counsel does this by presenting the evidence in favour of his client in what is known as examination-in-chief. After each witness has been so examined, opposing counsel does his best to upset or belittle this evidence by cross-examination. Cross-examination is never pleasant, and medical men, as do others, sometimes feel that they are being personally attacked and resent this. It should be mentioned here that barristers do not enjoy pulling to pieces a member of another learned profession; it is simply their duty to do so to further their client's interests.

After cross-examination the first counsel may re-examine his witness to obtain enlightenment on any question which has been brought out in cross-examination and which is not clear. It is hardly necessary to add that the evidence of a medical man is not privileged in respect of knowledge which he has acquired in a professional capacity, and that the court can compel the doctor to answer questions. Failure to do so will result in his being punished for contempt of court.

THE EFFECTS OF PUBLICITY

The disquiet in the medical profession at the recent trend in litigation is not entirely due to the increase in the number of cases which are being brought against the hospitals and doctors. It arises partly from the way in which cases are sometimes reported in the lay press. Thus the plaintiff's case on the first day may be reported in full, whereas on succeeding days the defence, and final decision, may be reduced to one paragraph. We make no suggestion of deliberate unfairness: it is merely that, after a day or so, other news makes headlines.

Press reports may have an impact on three sections of the community—the general public, the defendant doctor, and the medical profession generally. No small part of their effects is due to the conflict of opinion of expert witnesses engaged to support the plaintiff and the defendant; for those employed by each side are called because they will support the evidence which one or other side can bring forward. Suppose, for example, that each side has three expert witnesses. This means that on each side there are three medical men who may give diametrically opposite opinions to the other three and, this being so, the layman must assume that one side is right and the other wrong. It appears to him also that, given one set of circumstances, three doctors would have done one thing and three others the opposite. What is not apparent to the layman is that the defendant doctor may have been in the position of having to make one of these very decisions. Using all possible care and skill he selects one which may be right or wrong: it is a selection which is later supported by one set of witnesses, and the fact that it has proved unfortunate does not imply negligence. An expert witness may say that he would have done something different; but it is sometimes difficult to see how he can put himself—post mortem so to speak—in the position of the defendant doctor, who may well have less experience and knowledge than the witness but may nevertheless have shown all the care and skill within his competence.

These divergences of opinion between expert witnesses, each of whom may claim that his opinion on the given facts is the correct one, may have an unexpected effect

on the case ; for in order to reach a decision the judge and jury are thrown back on their own common sense. It is possible that some of the very heavy damages awarded recently would not have been given if the true prognosis had been more clearly understood. Moreover, reports of such actions can have a damaging effect on public confidence, for a patient in the future may suffer extra fear and trepidation when he is ill, or undergoing special manipulations.

It has been noted already that the object of an action for negligence is not the punishment of the defendant doctor. But in fact he may be severely punished, in that he suffers mentally, sometimes physically, and possibly financially. By reason of the trial his professional confidence may be shaken or lost ; the mental worry may lead to a physical breakdown, and he may suffer a loss of practice income.

The effect on the medical profession generally may be cumulative, for it may lead to a state of affairs where the doctor's first interest will be to make sure that he is fully protected against any possible charges. We may not come to the point of the surgeon taking his legal adviser into the operating-theatre with him, but the patient might conceivably be asked to sign an indemnity form against all liability before treatment is commenced.

DISCUSSION

The practice of medicine being one which demands that the mind of the practitioner should be free from fear and untrammelled by extraneous worry and care, it might be possible to postulate a set of principles, and see whether there are any means by which these could be fulfilled without prejudicing the rights of any other person should the practitioner fail in his duties. What the doctor requires are freedom of action to use methods of diagnosis and treatment which are in his judgment best for the particular case being dealt with ; freedom from fear of consequences of a genuine mistake or of an untoward and unforeseen reaction on the part of the patient, and freedom from fear of frivolous actions and vexatious litigation.

How can this freedom be ensured ? In regard to negligence, doctors are not members of a privileged profession. They must bear the responsibilities for their actions as do other members of the community, and this is not altered by the fact that they must show care and skill. What is causing concern today is not that doctors are liable for negligence—for no-one will deny that if a wrong exists it must be righted—but the way in which the existence or absence of negligence is decided.

A number of alternative means could be found for deciding claims for negligence. Thus the position might remain as at present, cases of negligence against hospitals and doctors being tried openly in the courts by a judge sitting with or without a jury. Or the case might be tried behind closed doors—though such a suggestion strikes at the roots of English justice and would be open to the objection that it creates a special procedure for medical negligence, as compared with negligence in general. Alternatively a degree of privacy which would appeal to the medical profession might be achieved if the publication of medical evidence in the lay press could be limited like the publication of details in divorce and certain other cases. The doctor giving evidence would then feel that the professional confidences which he had obtained were not being so widely broadcast, and the medical histories in the hospital notes would once more assume a confidential nature. Furthermore the confusing and contradictory opinions of expert witnesses would no longer harass the public and tend to destroy confidence in the medical profession.

From the legal point of view it would be impracticable to do away with the expert witness ; for he is necessary for the preparation of the case, and his examination and cross-examination are essential for its efficient conduct in court. The expert witnesses might, however, be limited in number to one on each side, and one or more medical assessors might sit with the judge. These assessors, who would have to be doctors of undoubted ability and integrity, would assist the judge on points in the evidence which were not clear. They might also be given power to examine the plaintiff, and would thus have first-hand information which would assist in assessing the amount of damages to be awarded. The assessors might be drawn from a panel based on the assize circuits. Nautical assessors already assist in Admiralty cases, and thus form a precedent for the institution of such a panel in medical cases.

Another means of dealing with cases of negligence would be to entrust them to tribunals specially constituted for the purpose. The National Health Service Act, 1946, could be amended by an Act declaring that all actions for negligence in which damages will have to be met from public funds shall be heard by a tribunal and not in the ordinary courts. Such a tribunal could act in one of several different ways. It might act like the old "grand juries" (abolished some years ago), deciding merely whether the prima-facie evidence of negligence was such that the case should be referred to the courts for trial. Or it might act as a court of law, hearing all evidence, deciding whether there was negligence, and assessing damages where appropriate. Such a tribunal might meet in private or be open to the public. If the latter it would differ in no essential respects from the courts.

Finally, it would not be impossible for the issue of negligence to be taken out of the case entirely and to make the liability strict. Patients attend hospital for help and treatment. They expect to obtain benefit from this, and if they do not obtain it they may feel aggrieved and think that they should receive recompense for this failure. The tribunal could be given power to award compensation—either as a lump sum or on a fixed scale—regardless of the cause of the failure and who was responsible.

CONCLUSIONS

When preparing this paper we consulted a number of people, including lawyers, both practising and academic. In our opinion drastic changes in the law are not indicated, and we believe that the use of medical assessors by the courts, the limitation of the numbers of expert witnesses, and a reasonable degree of restraint in the publication of medical evidence, would go far to improve the present position.

The laws of England are the results of the wisdom of centuries of judicial decisions, and in respect to negligence they are on a sound footing. What seems necessary today is not so much that the law of negligence should be changed, to suit the medical profession and the hospitals, as that medical students should be taught, and members of the medical profession have a sound understanding of, the law relating to negligence, and how negligence can be avoided.

One of the foremost ways by which a complaint of negligence may be avoided is to take the patient fully into confidence. A patient may enter hospital, and pass from one member of the staff to another, but still have little or no idea what the examinations and procedures are leading to. Nor is he always made to appreciate that some of the procedures are not devoid of risk, that the result may not be as anticipated, or that some unforeseen event may occur. If the significance of all that is taking place is explained to him and his consent obtained the risk of an action for negligence is greatly diminished. It may of course be argued that the explanation is not in the patient's interests—that if he is given too many details he will have cause to worry

and his condition will thus be made worse. But if the explanation is given in a reasonable way there can be no grounds for complaint; for "reasonable" is a word which is used frequently in connection with actions for negligence.

"Every person who enters a learned profession undertakes to bring to the exercise of it a reasonable degree of skill. He does not undertake, if he is an attorney, that at all events you shall gain your case; nor does a surgeon undertake that he will perform a cure; nor does he undertake to use the highest degree of skill. There may be persons who have higher education and greater advantage than he has; but he undertakes to bring a fair, reasonable and competent degree of skill."[4] This dictum must apply to all; there can be no exception in the case of members of the medical profession, who should bear in mind, in respect of negligence, *Punch's* advice to those about to marry.

USE OF ANTIMALARIAL DRUGS

Recommendations by Malaria Subcommittee of Colonial Medical Research Committee

IN 1949 the Colonial Medical Research Committee drew up recommendations on the use of 'Paludrine' (proguanil) in suppression and treatment of malaria; these were tentative on the basis of knowledge available at the time and were stated to be subject to revision in the light of future experience and experiment. The additional experience since gained makes it advisable to revise the recommendations and also to indicate the suitable methods of use of the different antimalarials now available. The revision is specially necessary in view of the further evidence which has been obtained that (*a*) some drugs which are effective in suppression of malaria are unsuitable for use in the treatment of the overt attack owing to their slow schizontocidal action, and that (*b*) the unsuitable use of certain antimalarials for suppression or for treatment of the overt attack may result in the development of drug-resistant strains of the malaria parasites.

Actions and Uses of Antimalarial Drugs

No single drug at present available is effective against all phases of the cycle of development of the malaria parasite; the preparation to be used for a particular purpose will be that active against the appropriate phase. The purposes for which antimalarial drugs are used are:

1. For causal prophylaxis or suppression (destruction of the parasite in the pre-erythrocytic phase or in the asexual erythrocytic phase).
2. For treatment of the overt malarial attack (destruction of the asexual parasites in the blood-stream).
3. For radical cure of vivax and quartan malaria (destruction of the late exo-erythrocytic forms).
4. For prevention of transmission (destruction of the gametocytes in the peripheral circulation or interruption of sporogony in the mosquito).

CAUSAL PROPHYLAXIS OR SUPPRESSION

The onset of a clinical attack of malaria can be prevented either by a drug acting on the pre-erythrocytic forms of the parasite (causal prophylaxis) or by one acting on the asexual erythrocytic forms (suppression).

(1) *Causal prophylaxis.*—The 8-aminoquinolines (pamaquin, primaquine) show such action, but the margin between the prophylactic and the toxic dose is too narrow to permit of their use for this purpose. The only drugs which can achieve this effect with safety are the biguanides (proguanil) and the diaminopyrimidines (pyrimethamine): their action in this respect is definite as far as falciparum infection is concerned. Since however they act also on the asexual erythrocytic forms of all species of human plasmodia their use as protective drugs is by no means confined to falciparum infections.

(2) *Suppression.*—Drugs used for suppression show the following characteristics, advantages, and limitations.

Quinine, formerly widely used for this purpose, has several disadvantages. For the effective suppression of falciparum malaria, it may have to be taken in doses as high as gr. 10 daily, and in New Guinea even this dosage has proved insufficient. Apart from the unpleasant side-effects which may arise from prolonged administration of this amount of quinine, its association with the precipitation of blackwater fever makes it unsuitable for use as a suppressant in areas where falciparum infections are prevalent.

Mepacrine is a very effective suppressant of all forms of malaria, but has certain disadvantages which detract from its usefulness. When taken over long periods it sometimes produces skin lesions, the most common of these being a lichenoid dermatitis. Yellow discoloration of the skin, a usual feature, is a further disadvantage.

Chloroquine and *amodiaquine* are probably even more powerful suppressants than mepacrine. Their action resembles that of the last-named drug, but they are on the whole less toxic and they do not tint the skin.

Proguanil and *pyrimethamine*, as well as being causal prophylactics in falciparum infections, are effective suppressants of all forms of malaria. They also have the advantage of preventing the completion of sporogony and of being considerably less costly than the 4-aminoquinolines. There is, however, a possibility that drug resistance may appear in areas where either of these compounds is in common use, particularly if they are employed indiscriminately as therapeutic agents, though proven examples of this are very rare. Cross-resistance has been shown to exist between proguanil and pyrimethamine, so that if resistance to either of them becomes apparent a switch-over to chloroquine, amodiaquine, or mepacrine is indicated; or, if none of these is available, to quinine.

TREATMENT OF THE OVERT ATTACK[1]

(1) *In non-immune subjects.*—For this class of patient it is necessary to employ one of the more powerful schizontocidal drugs, such as chloroquine, amodiaquine, mepacrine, or quinine.

Quinine has the disadvantage of its association with the precipitation of blackwater fever, and is comparatively ineffective against certain strains of malaria parasites. It cannot be relied upon to effect radical cure of infections with some strains of *P. falciparum*.

Mepacrine has a rapid action in all forms of malaria, but minor toxic manifestations and occasional psychoses of a more serious nature are definite drawbacks. The yellow tinting of the skin sometimes produced is also undesirable.

Chloroquine and *amodiaquine* are probably the most effective agents for terminating the clinical attack, and toxic manifestations of a serious nature are rare with either drug.

Neither proguanil nor pyrimethamine are sufficiently rapid in action to warrant their use in the treatment of malaria in non-immune subjects.

(2) *In subjects partially immune.*[2]—For the dispensary treatment of partially immune populations of malarious countries, a single-dose treatment with chloroquine, proguanil, amodiaquine, or mepacrine has proved effective. Good results have also been reported with pyrimethamine given as a single dose. In view of the possibility of drug resistance arising with both proguanil and pyrimethamine it seems wiser to reserve these drugs exclusively for prophylaxis and suppression and to use for therapeutic purposes chloroquine, amodiaquine, mepacrine, or quinine. If quinine is used, 2–5 days' treatment is usually necessary.

(3) *For emergency treatment.*—In the treatment of pernicious forms of malaria, whether cerebral, algid, or gastro-intestinal, oral administration of drugs is seldom

4. Per Tindall, C. J. *In* Lanphier and wife *v* Phipos (1838) 8 Car & Payne 474.

1. As a general principle in areas where drug prophylaxis or suppression is in operation, a different drug should be used for treatment of the clinical attack.

2 i.e., The indigenous inhabitants of malarious regions.

practicable; and since prompt action is necessary to save the patient's life, antimalarial drugs must be given parenterally in such cases. Quinine dihydrochloride intravenously has been a standard and successful treatment for many years. Mepacrine methane sulphonate may be given intramuscularly as an alternative. Recent work indicates that chloroquine is equally successful when given intramuscularly or intravenously. The intramuscular injection of quinine, still widely practised in many countries, has the disadvantage that it causes necrosis and may produce abscess. Whatever is used, as soon as the patient is able to take drugs by the mouth, all further medication should be by this route.

RADICAL CURE

(1) *Vivax and quartan malaria.*—The only drugs which are effective against the late exo-erythrocytic forms of the parasite are the 8-aminoquinolines. Pamaquin has been used for this purpose for many years, but recently primaquine has been shown by American workers to be more effective and less toxic. If an overt attack is in progress standard treatment with a schizontocidal drug should precede or accompany the course of pamaquin or primaquine.[3] This combined treatment is also applicable when falciparum malaria occurs in association with vivax or malariæ infections. Treatment of chronic relapsing malariæ (quartan) infections is the same as for vivax cases.

(2) *Ovale malaria.*—Many infections with *P. ovale* end in spontaneous recovery. Treatment with 8-aminoquinolines is not usually necessary.

(3) *Falciparum malaria.*—There is convincing evidence against the existence of late exo-erythrocytic forms of *P. falciparum*. Any relapses that may occur are due to the persistence of erythrocytic forms. Any of the more powerful schizontocides mentioned above will usually effect radical cure.

PREVENTION OF TRANSMISSION

The 8-aminoquinolines are the only drugs which are able to destroy the sexual forms of *P. falciparum* in the peripheral blood. Proguanil and pyrimethamine have no demonstrable action on the gametocytes in the blood, but both have the property of preventing them from undergoing full development in the mosquito, so that mosquitoes feeding on patients taking either of these drugs are unable to transmit the disease to others.

Suggested Dosage

Unless otherwise stated the dosage suggested is for adults. That for children should be calculated according to age and weight.

CAUSAL PROPHYLAXIS AND SUPPRESSION

(i) *Proguanil monohydrochloride.*[4]—Adults, 100 mg. daily. Children, 0–5 years, 25 mg. daily; 6–12 years, 50 mg. daily. Adults partially immune, 300 mg. once weekly. Or

(ii) *Pyrimethamine.*—Adults, 25 mg. weekly. Children, 0–5 years, 6·25 mg. weekly; 6–12 years, 12·5 mg. weekly. Or

(iii) *Chloroquine diphosphate or sulphate.*—Adults, 300 mg. base weekly. Or

(iv) *Amodiaquine dihydrochloride dihydrate.*—Adults, 400 mg. base weekly. Or

(v) *Mepacrine hydrochloride.*—Adults, 100 mg. daily. Adults partially immune, 300 mg. once weekly. Or

(vi) *Quinine sulphate or dihydrochloride.*—Adults, 650 mg. (gr. 10) daily. Recommended only when none of the drugs listed above is available.

No suppressive regimen will be effective unless followed with the utmost regularity.

3. Mepacrine should not be given concurrently with any of the 8-aminoquinoline drugs.
4. In parts of Africa the scale of dosage for proguanil given above has been found insufficient; in Nigeria, for example, the following scale has been recommended: Adults, 100–200 mg. daily. Children, 0–1 year, 50 mg. three to six times weekly; 1–3 years, 50 mg. daily; over 3 years, 100 mg. daily.

In the case of persons who have been resident in an endemic area for some time, or who have otherwise been exposed to malaria infection, a full therapeutic course should be taken before entering on a suppressive regimen, if there are grounds for suspecting active or latent falciparum malaria.

If mepacrine is the drug employed, administration should be commenced 14 days before entering an endemic area. Administration of the other drugs should be commenced immediately before entry.

If the drug used is not affording protection in the dosage recommended, when taken regularly, a change should be made to another suppressive.

The prophylactic regimen should be continued for one month after leaving an endemic area.

TREATMENT OF THE OVERT ATTACK

(1) *For non-immune subjects:*

(i) *Chloroquine diphosphate* or *sulphate* 600 mg. base, followed in 6 hours by 300 mg. base, then 300 mg. base daily for 2 days. Or

(ii) *Amodiaquine dihydrochloride dihydrate* 600 mg. base, followed by 400 mg. base daily for 2 days. Or

(iii) *Mepacrine hydrochloride* 300 mg. t.d.s. on first day, 300 mg. b.d. on second day, then 100 mg. t.d.s. for 5 days. Or

(iv) *Quinine sulphate or dihydrochloride* 650 mg. (gr. 10) t.d.s. for 7–10 days.

(2) *For subjects partially immune:*

(i) *Chloroquine diphosphate* or *sulphate* 600 mg. base in single dose. Or

(ii) *Amodiaquine dihydrochloride dihydrate* 600 mg. base in single dose. Or

(iii) *Mepacrine hydrochloride* 300–500 mg. in single dose. Or

(iv) *Quinine sulphate or dihydrochloride* 1000–1500 mg. (gr. 15–20) daily for 2–5 days.

(3) *Emergency treatment:*

(i) *Quinine dihydrochloride* 650 mg. (gr. 10) in sterile normal saline injected intravenously and repeated in 6 hours if necessary. Not more than three injections should be given within 24 hours. Distilled water can be used as a solvent if the volume does not exceed 10–15 ml. It is imperative that quinine be injected slowly, at a rate not exceeding gr. 1 per minute. Or

(ii) *Mepacrine methane sulphonate* 375 mg. or *mepacrine hydrochloride* 300 mg. intramuscularly, repeated in 6 hours if necessary. Or

(iii) *Chloroquine salts.*—The *hydrochloride* is given intramuscularly in dosage of 200–300 mg. of base (supplied in ampoules in aqueous solution), repeated in 6 hours if necessary; and intravenously, 400 mg. of base in 500 ml. normal saline by intravenous drip over a period of 1 hour. The *sulphate* supplied in 5 ml. ampoules (40 mg. base to 1 ml.) is given in dosage of 200 mg. base intravenously, repeated after 8 hours if necessary.

RADICAL CURE OF VIVAX AND QUARTAN MALARIA

(i) *Pamaquin naphthoate* 8–10 mg. base t.d.s. for 10–14 days. Or

(ii) *Primaquine diphosphate* 15 mg. base daily for 14 days, or 7 mg. thrice daily for 14 days.

During an overt attack a course of treatment with a schizontocidal drug must also be given. This applies also when falciparum malaria is associated with either a vivax or a malariæ infection. Some authorities include treatment with a schizontocidal drug even though no active symptoms are apparent.

Careful supervision is necessary over patients taking any of the 8-aminoquinoline drugs, because of the occasional unpredictable occurrence of acute intravascular hæmolysis with or without hæmoglobinuria.

NOTES

Each 261 mg. tablet of *amodiaquine dihydrochloride dihydrate* salt contains 200 mg. of base.

Each 250 mg. tablet of *chloroquine diphosphate* salt contains 150 mg. of base.
Each 200 mg. tablet of *chloroquine sulphate* salt contains 150 mg. of base.
Each 100 mg. tablet of *mepacrine hydrochloride* contains 79 mg. of base.
Each 375 mg. ampoule of *mepacrine methane sulphonate* is equivalent to 300 mg. of *mepacrine hydrochloride*.
Each 18 mg. tablet of *pamaquin naphthoate* or 10 mg. tablet of *pamaquin dihydrochloride* contains 8 mg. of base. For practical purposes 2 naphthoate = 1 base = 1 *dihydrochloride*.
Each 13·2 mg. tablet of *primaquine diphosphate* contains 7·5 mg. base.
Each 100 mg. tablet of *proguanil monohydrochloride* contains 87 mg. base.
Pyrimethamine is prescribed in the form of base, *not* as a salt.

Antimalarial Drugs and their Synonyms

Amodiaquine
Cam-aqi, Camoquin, Flavoquine, Miaquin, SN 10751.

Chloroquine
* Aralen, † Nivaquine B, Resochin, Tanakan, SN 7618, 3377 RP.

Mepacrine
Acriquine, Arichin, Atabrine, Atebrin, Atebrine, Chemiochin, Chinacrin, Crinodora, Erion, Haffkinine, Italchina, Malaricida, Methoquine, Metoquina, Metoquine, Palusan, Quinacrine.

Pamaquin
Aminoquin, Beprochin, Fourneau-710, Gamefar, Pamaquine, Plasmochin, Plasmocide, Plasmoquine, Præquine, Quipenyl, Rhodoquine.

Proguanil
Balusil, Bigumal, Chlorguanide, Chloriguane, Diguanyl, Guanatol, Paludrine, Palusil, Tirian, M 4888, SN 12837.

Primaquine
SN 13272.

Pyrimethamine
B-W 50-63, Daraprim, Malocide.

* Aralen is *chloroquine diphosphate*.
† Nivaquine B, or Nivaquine, is *chloroquine sulphate*.

Reconstruction

AN EXPERIMENT IN FAMILY PRACTICE WITHIN THE NATIONAL HEALTH SERVICE *

F. CHARLOTTE NAISH
M.A., M.D. Camb.

DURING the past 6½ years I have been adding "extras" to my general practice in an attempt to make it truly a family practice.

The practice is mainly urban. 80% of the births are attended by me or my partner, either in the mother's home or in nursing-homes. An antenatal clinic is held at a separate time from the ordinary surgeries and the mothers are encouraged to attend monthly or at shorter intervals. During the past 2 years my partner has held a relaxation class once a week at which she gives instruction in antenatal and postnatal exercises; most of the primiparæ and a few multiparæ attend. Once a week we hold a clinic for mothers and babies only. A health visitor employed by the local authority attends to weigh the babies, and her advice is useful in sorting the cases for consultation. Before this the mother and baby (hospital cases as well as our own) are visited at home, and the baby is weighed with portable scales. It is usually sufficient to visit twice in the third week and then once weekly to the sixth week. Birth-control advice is offered at the postnatal examination, and, if it is wanted, the mother returns at an appointed time in the evening when she can leave the baby at home. She buys her own appliance, but no charge is made for the fitting and for the advice given.

For 4 years there has been a well-attended mothers' club, and a smaller, but equally enthusiastic, fathers' club. Here an attempt at health-education in its broadest sense is made and the talks and discussions have covered a wide range from infant care to juvenile delinquency. Here also the mothers are taught the early signs of illness, when to send for the doctor, how to nurse a sick child at home, how to prepare a child for admission to hospital, what a child-guidance clinic is for, and much else which improves the mother-child-doctor relationship. The fathers discuss many topics arising out of their particular home problems and the wider issues of good citizenship. In doing so they get a better view of the mothers' difficulties and learn how they can enjoy giving help with the family problems.

It would seem obvious that such an attempt at family practice should give good results; but those results are hard to measure. How can one measure health? How can one measure the mental good-health of a family as a whole?

It occurred to me that there was at least one measurable index, and that was the non-admission to hospital of children with medical complaints which *could* be treated at home.

In the accompanying table, patients under "medical 1" were admitted as medical cases: those under "medical 2" were admitted as query-surgical cases and the diagnosis was proved incorrect.

Year (July–July)	Population of practice	Children under 11 years	Births	Birth-rate per 1000 patients	Birth-rate for York	Admissions of children under 11 years to hospital								Deaths under 1 year
						Casualty	Surgical	Tuberculosis	Tonsils and adenoids	Medical				
										1	2	Total	%	
1948–49	3500	530	58	16·6	18·4	..	8	1	6	1	12	13	2·6	0
1949–50	3450	570	58	16·8	17·3	1	7	..	6	5	4	9	1·6	1
1950–51	3350	625	62	18·5	15·8	3	3	1	3	2	5	7	1·1	1
1951–52	3280	690	67	20·4	14·6	5	4	..	2	2	4	6	0·9	1
1952–53	3200	760	72	22·5	14·2	3	5	1	3	1	2	3	0·4	1

Other notes on the table are:

1. Among the casualties admitted there was not one case of burns or scalds.

2. The tuberculosis cases consisted of two patients with mild general symptoms and positive Mantoux tests and a third with tuberculous meningitis, who recovered. (He reached hospital 5 days after the onset of malaise.)

3. The following are omitted from the table altogether:
(*a*) Three inevitable deaths (one leukæmia, one aplastic anæmia, and one sarcoma).
(*b*) Six cases of poliomyelitis (no deaths).
(*c*) All fever-hospital cases. All these were cases of scarlet fever, and admission to hospital was determined by the father's occupation, not by the wish of the mother or doctor. Where the father worked with food, home nursing was not allowed.

4. Of the infants who died, three were premature babies under 3 lb. in weight, two of these being twin births. All these were born in hospital. The fourth death was from whooping-cough in a twin of 7 weeks, birth-weight 5 lb.

5. The birth-rate has risen during the 5 years, and the number of children under 11 has risen apart from the increase by births. The practice population, on the other hand, has fallen, mainly because of re-housing on outlying estates and because of the N.H.S. "purge" of lists.

6. The number of children under 11 (this arbitrary limit has been chosen because I have been in York 11 years) is perforce an estimated figure. No practice is ever static, and in a period as long as 12 months there is considerable movement of people. The average for the year has therefore been estimated; but the estimate (checked by two methods) is, I hope, fairly reliable.

7. For each year the expected number of infant deaths, calculated from the infant-mortality rate of the city, is between 1 and 2. So the actual deaths do not suggest that the reduced admissions to hospital have involved any added risk to the infants. Apart from the inevitable deaths mentioned above (3*a*) there have been no deaths among children more than a year old.

CONCLUSION

I think it would be fair to conclude that there have been some gains to the child patients. It would appear that their mothers are growing more capable of sending for the doctor in the early stages of illness, when the

* From a lecture delivered at Oxford (Medical Consilia) on Oct. 15, 1953, and before the Caernarvonshire Pædiatric Club on Oct. 22, 1953.

condition can be treated at home, and also that they are managing to nurse them at home effectively.

To the doctor there appears to be a loss, at least as far as the first 5 years show. I have done more work than the N.H.S. demands, without increase of income. It may be that this work will pay a good dividend in healthy families in the future, but it seems unlikely that an unenthusiastic doctor would take it on without some financial inducement. As the duty of paying a doctor for preventive services rests at present on the local authorities, the Ministry of Health will naturally hesitate to offer such an inducement the cost of which will fall on the general medical services.

The Widdicombe File

XII. DOWN IN THE REGION

Underwater Hospital,
Underwater.

DEAR SIR DANIEL,

I am sending you, as you request, a summary of our findings in John Jones, aged 3. Biopsy shows that he has a Wilms tumour with extensive secondaries, and is beyond our aid. His end cannot be far off, and I only hope it gives his parents some comfort that he should die in a teaching hospital rather than with us. Mrs. Jones took him out of Underwater against our advice, and was rather unpleasant about the whole thing. She is convinced that you will know some new treatment that we have never heard about, and in her distraction I can forgive her anything; but she is only an example of an attitude of mind that is quite widespread down here. It is simply that when we cannot give a good prognosis and assure a rapid cure, the children are removed to London. Even if we offer them a second opinion they refuse it, for their one object is to get the child under a London consultant and be shot of us. Of course our diagnoses are sometimes wrong, and even more often we are completely foxed, but I find these are the cases we ourselves refer to you, and we are grateful for your help.

There is no mystery why parents do these things, and who can blame them if you and your hospital are famous and we are not. Lack of fame is not necessarily synonymous with ignorance or incompetence, but the public nevertheless believes that nothing later than Hippocrates has percolated down our way. Maybe there is an element of truth in it, but I am certain it is not the whole explanation, which is much more fundamental. Unfortunately we work in hospitals with a past, and we suffer a visitation of "the iniquity of the fathers upon the children unto the third and fourth generation of them that hate me."

* * *

Before the National Health Service started, the hospitals now administered by regional boards either were voluntary or belonged to the local authority. The former certainly had the voluntary spirit, and radiated the local pride which kept them going; but the staff were mostly general practitioners, and the ancillary services such as pathology and radiology not infrequently somewhat primitive. They could and did deal perfectly adequately with the routine stuff, but anything more difficult was sent to London. The local-authority hospitals lacked not only the voluntary spirit, but only too often the human touch as well. They had their origins in "The Workhouse"; and as a matter of fact the older inhabitants round here still refer to Underwater as "The Union." With the passage of time, the medical work grew and the workhouse shrank; so the name was changed from workhouse to hospital; but just as when the Rat-catcher became the Pest Officer, the change of title made no difference to the function. These so-called hospitals were managed by the public-assistance department with its poor-law outlook; and though later on (in our case very much later on) the public-health department took over, they had neither the time nor the money to do much about it.

I first came to Underwater in 1939 with the E.M.S., and to one who had been nurtured in the gentle atmosphere of a teaching hospital it was horrifying. The buildings, with few exceptions, were bare and barrack-like, with the patients crowded in to overflowing. The nursing staff was insufficient and inefficient, and the male orderlies both callous and brutal. One sensed that the inmates were there to die and were expected to coöperate by not taking an unconscionable time about it. Can you wonder that its reputation stank for miles around, and that nobody would go there until he was unconscious or too weak to protest?

The E.M.S. changed all that, and the N.H.S. has improved things even more. The buildings were modernised and equipment flowed in. The original nursing staff departed in toto, without mourning or regret; and, though we are still desperately short of nurses, what we have are not bad. The medical staff, which in 1939 consisted of five general-duty officers, is now fourteen consultants, all properly qualified and trained, and ten residents. We have fewer patients to care for than in the bad old days. The pathological side of our service could and should be improved; for, though the quality is excellent, the quantity is too small. In London you have bacteriologists, biochemists, hæmatologists, histologists, and morbid anatomists, each with assistants and technicians, whereas at Underwater there is one pathologist and a few technicians who have to cope with all our work. This staff must be increased, and I hope that nobody will try and substitute an area central laboratory in its place. Such an institution is like a sausage-machine, with material going in at one end and results emerging at the other; and the results, like sausages, are often of dubious quality. We must be able to discuss our problems with the pathologist, so that both sides can know the extent of their limitations. This is particularly important in pædiatrics, where biochemistry now looms so large; but Underwater is like Hamlet without the Prince of Denmark, for no biochemist walks our stage.

The deficiencies I have mentioned are fortunately not crippling, and in spite of them we are both competent and equipped to deal with most of the problems that confront us. We should have gained the confidence of our patients, and to a large extent we have; but memories of the past still lurk in too many minds. The public is not to blame, because nobody has ever told them of the changes that have been brought about in their hospitals. They can see the new chairs and the canteen in outpatients, but how are they to know the ability or training of Dr. A as compared with Dr. B? They cannot judge whether an X-ray film is good, bad, or indifferent—much less the value of the radiologist's report on it—and the whole working of the pathology department is entirely outside their ken. I think it would help if they were enlightened on these matters.

* * *

If then our need is publicity and propaganda, no opportunity is lost to see that we don't get it, and in fact the only time we are likely to get in the news is if somebody brings an action against us for negligence or some cataclysmic disaster befalls us. Our day-to-day work is unknown. Take television as an example. There have been two programmes depicting hospital life—both of them to my mind nauseating, but let that stand. The important thing is that they featured teaching hospitals, when one of them at least could have dealt with Underwater. On another occasion there was a film showing a coloured nurse undergoing her training at the Middlesex Hospital, afterwards returning home to

disseminate her knowledge. This was grossly unfair, because I am sure that most coloured nurses don't train at teaching hospitals, and if you met one in Central Africa she would more likely be familiar with Underwater than the Middlesex.

Another thing that would help us would be some visits from V.I.P.s. The press notices and photographs that go with them catch the public eye, and they rightly feel that a hospital worthy of such a visit can't be too bad. I do not forget that we ourselves must take a hand in the matter, and not expect everything to be done for us. My one experience in this line was quite encouraging, for I managed to get a small article and a photograph of one of our patients in a national daily. Quite a lot of local people saw it, and subsequently some of our ex-nurses and residents sent us reproductions that they had cut from their local newspapers in Australia, South Africa, Germany, and South America. I admit that this is only small stuff, and that for a major effort we shall require the help of the Ministry of Health; but, as they have nothing to be ashamed of, they shouldn't be too difficult to stimulate.

Do you think we could make this a coöperative effort?—because so far the teaching hospitals have been ivory towers, with little knowledge of what goes on around them. Our professional lives are widely affected by advice given and decisions made by the teaching hospitals, and we would accept this more readily if we thought you knew a little more about us.

Yours sincerely,

JAN STEWER.

Parliament

QUESTION TIME

Home Care of Aged

Sir WALDRON SMITHERS asked the Minister of Health if, in view of the high cost of maintenance of old patients in hospitals and of the shortage of nurses, he would consider the advisability of setting up a committee to inquire into the practicability of making an all-in payment to relatives or friends willing to take chronic cases into their homes.—Mr. IAIN MACLEOD replied: I do not think it would be feasible to introduce arrangments of the kind contemplated. Apart from the fact that sometimes it would not be in the interest of patients to be cared for at home, there is already provision whereby, in suitable cases, financial assistance could be sought from the National Assistance Board.

W.H.O.'s Budget

Replying to a question, Mr. MACLEOD said that the proposed increase in the World Health Organisation budget involved additional expenditure of about 1,800,000 dollars. The United Kingdom delegation was authorised to agree to an increase of about 1 million dollars but to oppose the further increase on the ground that it was attributable to projects which should be financed through the expanded programme of technical assistance.

Pay Beds

Replying to a question, Mr. JAMES STUART, Secretary of State for Scotland, said that about a quarter of the hospital beds for private patients in the Scottish Western Region were unoccupied, on the average, during the latest period for which figures were available. This represented about 100 beds scattered over 33 hospitals. He did not think that 100 beds vacant in 33 hospitals was a large number. There were always gaps whether for paying or non-paying patients between the discharge of one patient and the admission of another.

Dentists in the Forces

Replying to a question, Mr. E. N. C. BIRCH, parliamentary secretary to the Ministry of Defence, said that 512 qualified dentists were at present serving in the Armed Forces—97 were in the Royal Navy, 250 in the Army, and 165 in the Royal Air Force.

In England Now

A Running Commentary by Peripatetic Correspondents

I AM no good at gardening but I do enjoy trimming my privet hedge; for this humble occupation gives me a chance to turn philosopher. My hedge, with its uniform structure, its growth and decay, its activity and rest, its stability and change, is not unlike society. For instance, this cheeky twig, overtopping his fellows, reminds me of the human unit who shoots out his neck and tries to get the best of everything. Here is the woman who jumps the queue; the arrogant, flamboyant man who has got on; the nasty kid who is always shouting "Me first"; the aggressive, swaggering individual that no one can curb. Here to my hand are the bombast, the snob, the upstart, the cheat. Snip, snip, go my shears; and heads drop around me in my gigantic purge, giving the hedge a mathematical seemliness and my soul an artistic satisfaction.

"But," occasionally says my better self, "that may be a genius and should be preserved." Then I have an argument with myself, generally coming to the conclusion that genius is so rare that it is most unlikely to be found in any social structure or privet hedge of my acquaintance, and that my first diagnosis of swanky selfishness has more chance of being correct. In any case, a genius usually fills a gap, and is never quite the saucy twig I have in mind but rather the strong, resolute shoot which, in the old days, our forbears left here and there in our country hedgerows to greet us now as tall, well-spaced trees.

"But what about back pruning?" you may ask. Of course I haven't forgotten that. All too well I know the chunks of dead wood and the dead-alive branches that keep interfering with the clamant new growth, twisting and deforming active twigs into roundabout ways and leading to the deterioration of the hedge. Their social counterparts are the miserly curmudgeon of an old man; the enslaving, demanding old woman; the frustrated "youngsters" of 45 and more whose lives have been given up to mum and dad. Snip, snip, go my secateurs; for it is a tricky job dealing with the aged things that in their day contributed to the hedge which is now my delight; and I have abandoned the shears for more kindly treatment. Here one must ever be careful not to injure the solid living wood that gives to the hedge its substance and permanence—the wisdom and stability of its long heritage.

"But what a terribly uniform, uninteresting society you are going to make," you may say. Well, perhaps you're right. But I've got a jolly nice hedge.

* * *

"Where are the children?" asked my wife. "I left them in the department in the animal house. There are some new baby rabbits. I expect they will be back in a few minutes" I answered. But the minutes ticked on to something over an hour. "I wish you would go and see what they are doing, it's getting dark and they may be frightened."

Recognising the finality of the situation, I got up and went across to the department. The noise of my footsteps going up the stairs was an "indifferent stimulus" for the conditioned response of the guineapigs, and I opened the door of the animal house to a crescendo of squeaks. The children were not there.

Down the stairs again and I switched on the lights in the museum. Still no sign of them, but I could hear them. Quietly I looked into our long dissecting-room. There they were: George (11) and Catherine (10), the light on over a table, white sheet turned aside. "Don't be silly, George, the heart is not down there, it's up here." Catherine was always the quick one. "What's this, then?" asked George. From the distance it looked like the spleen. "I don't know. Do you think this is the liver? It's not like the liver Mummy gets from the butcher, it's hard." I walked over and sat down beside them and told them about the contents of the open abdominal and thoracic cavities.

Dislike for the "dead" does not appear to be an inherited characteristic. The female tremor of distaste and the hearty male laugh—symptoms of the adult taboo—are obviously an acquired reaction. Is it wholly

mimetic, simply a convention; or has it deeper roots as far back as our troglodytic ancestors who initiated the practice of burying their dead?

* * *

Sarah Milicent Brown lived in a small, terraced house, in a grim and sordid suburb of a northern city. She was cared for by an only daughter who was an albino, and who had been given, by some waspish twist of fate, the name of Blanche. This poor girl, who could not bear the light, moved about the darkened house like some pale spectre of the night. When I saw the old lady for the first time in 1933, she had already been bedridden for five years following a stroke which had left her paralysed.

She was in perpetual dread of draughts. The window of her bedroom was permanently closed and the heavy curtains drawn. The chimney was blocked by a mass of crumpled paper, and a small tongue of leather was attached to the key-hole to stifle the piping of the wind. Heat was supplied by a fuming oil-stove and light by a bracketed gas-jet, which spluttered fitfully in the choking atmosphere and did little more than trouble the gloom.

When I opened the door on my first visit, it took me some time to accustom myself to the dark, but as soon as I could see I went over to the curtains and drew them aside. For the first time in five years daylight flooded the bedroom. And then I threw open the window and took a long breath. Sarah Milicent Brown eyed me from her bed with a look of intense dislike and, in a voice surprisingly firm for an invalid, commanded me to shut the window at once. I was about to protest when Blanche, who had followed me silently into the room, slipped behind me and brought the window down with a bang as though the air outside had been thick with contagion. I realised I had committed a grievous offence, and it took me two years of patient visiting to regain the old lady's favour—two years and many more to follow with the curtains drawn and the window tightly sealed.

On the night of Nov. 5, 1953, the noise of fireworks in the street had made her fretful and sleepless, and Blanche had called me in to give her something to calm her down. I was groping around in my bag for my syringe when she leaned over and plucked at my sleeve and said:

"What kind of a night is it?" It was the first time I had known her to inquire about the world outside her room.

"Dark and foggy—you're better here in your bed." I thought she smiled—but in the dim and lurid light it was impossible to be certain.

"You may open the window, now, doctor."

I drew the curtains slowly and hesitated; but she nodded approval, so with difficulty, for it was stiff with disuse, I forced the window wide open. A thin November fog, acrid with the smell of gunpowder, trailed into the airless room. And when I turned round she was dead.

* * *

REACTIONS OF A MORBID ANATOMIST TO MAKING THE ACQUAINTANCE OF THE KAUFFMANN-WHITE SCHEME

I'm sure when White and Kauffmann wrote their Salmonella scheme
They little thought that they'd composed the poetaster's dream.
Who minds anaerogenesis or antigenic loss?
There's consolation in the sound of names like *Hvittingfoss*.

While *morehead* dreams of *poona*, with *havana* and *champaign*,
I drive *uphill* from *nottingham* with *thompson* in the rain.
We'll stop and have a *worthington* in *shipley* on the way
We'd have made it a *manhattan* had it been a *desendai*.

My *mission* will require me fly out to *kaapstad* soon
By *napoli* and *cairo* through an *æquatorial* noon.
Mendoza, old *hidalgo*, will put on his *panama*
And join me in *nairobi*—then it isn't very *pharr*.

Aunts *adelaide* and *berta* will enjoy the *eastbourne* sun
An *infant is* quite happy with *banana*, *ball* and bun.
Let *hindmarsh* take *madelia* in his *austin* to Dunoon,
But *give* me *loma linda* and a *pensacola* moon!

Before the Salmonellæ lose their eponymic names
(*Way cross* the wide *missouri* and to *georgia* away!)
Ere Arab numerals replace the Roman ones, who blames
A *london* salmonellogist who *sanga* little lay?

Letters to the Editor

RAUWOLFIA IN HYPERTENSION

SIR,—The search for hypotensive drugs of low toxicity, and especially for those which are effective when given orally, has given rise to considerable interest in alkaloids from the root of *Rauwolfia serpentina*. Reserpine has been shown to have such a hypotensive action. The most recent communications, by Dr. Doyle and Professor Smirk, and Dr. Joiner and Dr. Kauntze (May 29), prompt me to send this note on results obtained in a small series of hypertensives.

Twelve patients suffering from chronic benign hypertension have been treated with reserpine ('Serpasil'). All were known to have had symptoms of high blood-pressure for five years or more. All presented secondary cardiovascular changes. In two there were retinal hæmorrhages and exudate. The lowest blood-pressure recorded after a week's rest was 210/120 mm. Hg, the highest 250/160.

Each patient was kept in bed for the first week but allowed up for visits to the lavatory and bath. No restrictions were placed on diet. No drugs were given except for constipation or insomnia. The blood-pressures were recorded not less than four times daily, and if a daily variation of more than 20 mm. Hg systolic or 10 mm. Hg diastolic occurred during the last two days of the week, treatment was postponed until greater stability was established. Once it was started the patient was encouraged to lead a more active life, walking about the ward or in the grounds of the hospital.

At first the makers' recommended dose of 0·25 mg. four times daily was given, but it was soon apparent that no hypotensive effect was thereby achieved. Subsequently the amount was raised to 1 mg. four times daily, and, if ineffective, this quantity was doubled. In only one instance was as much as 16 mg. daily given. This dose had to be abandoned on account of dizziness and drowsiness unaccompanied by an appreciable fall of blood-pressure.

As to results, in two patients no effect on hypertension was produced by 16 and 8 mg. doses daily. In a further two a daily dose of 4 mg. resulted in a sustained reduction of systolic pressure by 30–40 mm. Hg and of diastolic pressure by 10 mm. Hg. The remaining eight patients required 8 mg. daily to achieve this or greater effect.

By far the most striking result is to be seen in the systolic pressure readings. A heart-rate of between 50 and 60 is usually noted within 3 days after treatment is started. There is no relationship between the slowness of the heart and the effect on blood-pressure.

Drowsiness and dizziness affected all patients on 8 mg. daily, but passed off in some after a few days. Of the twelve cases two developed pronounced tremor within 24 hours when the dose was raised from 4 to 8 mg. daily. This was of coarse type, accompanied by occasional twitching of the limbs, chattering of the teeth, and mental distress. On halving the dose the tremor disappeared. I have not encountered the pruritus described by Joiner and Kauntze.

It seems probable that reserpine will be of some value in the treatment of benign hypertension, but close supervision is needed. It is possible that lower doses in conjunction with other hypotensive drugs will be more effective. This is being studied. For the intelligent patient no substitute has as yet been found to equal hexamethonium bromide, self-administered parenterally.

London, W.1. A. H. DOUTHWAITE.

ARTHROPLASTY *v.* ARTHRODESIS

SIR,—I am not at all sure what Mr. Norman Capener is getting at (June 19). Apart from his unhappy reference to insults and stigmata, which can safely be ignored, he admits even more strongly than I did the failure of many arthroplasties of the hip-joint, but without being willing to consider one obvious source of failure—namely, that the good idea of surgical reconstruction of a mobile and painless hip has often failed because of imperfect technique: "it was not that the operation was bad but that it was done badly" (June 12). His reply seems to be that the operation should not have been done at all.

We all know that 'Vitallium' cups have seized in the acetabulum, or been stuck on the neck of the femur—to our chagrin it has happened to all of us. We all know that free excisions of the femoral head, or even the femoral neck as well as the head, have been vainly replaced by prostheses which soon worked loose—and we should have known this from the beginning. If we know these things why do we not say them? Are we to be deterred, as has been suggested, by the fear of litigation? Are we not to write to *The Lancet* lest a solicitor reads our letters? If this is to be so we had better abandon all ideas of surgical progress and bask in safe mediocrity.

I for one will go on saying that hitherto the failures of arthroplasty of the hip-joint have very often been the consequence of failures of technique. If we pay more attention to the intelligent thought and precise technique of Fitzgerald in one type of operation, and of Crawford Adams in another, the next review of 500 cases after five years will be very different from the last.

It seems odd that I should find myself defending arthroplasty of the hip-joint, because the whole purpose of my letter of June 12 was to reiterate the belief I have held for many years that arthrodesis is best for monarticular arthritis in all young patients up to the age of 60-odd years.

London, W.1. REGINALD WATSON-JONES.

SIR,—I am unable to resist some comments on the statements by Sir Reginald Watson-Jones (June 12) that "there is no difficulty whatever in securing sound arthrodesis of the hip-joint . . .", and that "if a surgeon wants to arthrodese a hip-joint he can always do so."

As one who believes ardently in arthrodesis of the hip-joint, I am in complete agreement with Sir Reginald regarding the excellence of hip fusion in unilateral disease. It is a great pity that patients cannot more easily be made less horrified at the first suggestion of "having the hip stiffened," and it is a pity that the general public cannot know the disappointments hidden in the attractive-sounding operation of arthroplasty.

But to suggest that the painful hip can *quite easily* be got into the idyllic state of osseous union is certainly not the experience of most orthopædic surgeons. If arthrodesis of the hip by standard methods were a trouble-free procedure recent exponents of arthroplasty would have had to face much more serious competition than has been the case. In osteo-arthritis (malum coxæ senilis), where the bone is often densely sclerosed and where the leverage of the long shaft of the femur is immense, the hip is still the most difficult joint to fuse of any in the whole body. Stinchfield and Cavallaro [1] found that in 58 cases of osteo-arthritis 26% failed to achieve osseous union (and presumably therefore had to face a second operation). 10 cases of this series showed delayed union and required prolonged fixation, which means (my own calculation from their figures) that 43% did not proceed according to the plan that the surgeon had predicted when advising these patients to submit to the procedure. One can fairly safely assume that this 43% must have lost permanently a considerable range of movement in their knees.

The fact is that the patient with a failed arthrodesis (by orthodox techniques) is in almost as pitiful a state as one with a failed arthroplasty. The only way a patient can cope with an arthrodesed hip is by virtue of a fully mobile knee. A stiff hip *and* a stiff knee is a calamity. So many surgeons have realised this that they have shown sound surgical judgment in deliberately choosing an imperfect arthroplasty, giving partial relief in a short time, rather than to risk the possibility of being landed with the long-drawn-out horror of a failed arthrodesis.

The technique of central dislocation of the hip which I advocate [2] guarantees full knee movement because the knee is fixed for only four weeks. But even by the central dislocation technique I have never evaded the frank admission that osseous union is possible in only about 75% of the older patients with osteo-arthritis. The almost uncanny feature of this operation, however, is that the ability to bear weight without pain is just as good when it is a fibrous ankylosis as when osseous. This is a statement which may appear exaggerated and irresponsible to surgeons accustomed to identifying fibrous ankylosis with failure. It would seem that fibrous ankylosis is painful after "orthodox" attempts at hip fusion because the hip is potentially unstable if osseous union fails and the fibrous union is thereby subjected to stretching forces. If osseous union fails after central dislocation, the hip still has greater stability than before operation, because a bone-block is present to sustain the weight of the body and the fibrous union cannot therefore be stretched.

By the central dislocation technique, as I use it in elderly patients with osteo-arthritis, the average stay in hospital is about eight weeks. At the end of this time they are able to look after themselves at home, do not require any form of physiotherapy whatsoever, and use a stick only during the first three or four months while regaining balance and confidence. This procedure of stabilising the hip and removing pain has many features in common with the displacement osteotomy of McMurray, but has important advantages in the shortness of the postoperative programme.

Department of Orthopædic Surgery, Royal Infirmary, Manchester. JOHN CHARNLEY.

1. Stinchfield, F. E., Cavallaro, W. V. *J. Bone Jt Surg.* 1950, **32A**, 48.

IS HYPERTENSION A DISEASE?

SIR,—With reference to your leading article of June 12 I would like to make some observations and ask some questions based on my experience in general practice:

If disease means difficulty at being at ease, then hypertension is certainly a manifestation thereof.

If the western half of civilisation is hypertensive, then why not study the "abnormal" persons among us to get some idea of how to rearrange our existence to keep what is good and remain healthy?

Renal studies have shown a mechanism of producing hypertension. What about an equivalent, though apparently different, mechanism in other organs? For example, what diminution of blood-flow is to the kidney so could lack of exercise be to the extracellular electrolyte distribution; or could hypertension be an attempt to increase the hydrostatic element to compensate for disturbance of the electrolyte pattern brought about by dietetic and/or endocrine imbalance?

If genetic inheritance is important then we cannot do a great deal about it unless we start selective breeding. (Or are we unwittingly selecting factors which carry with them diminished reserve to stress?) Why not consider "environmental" and/or "familial" inheritance as a pattern?

Awareness of hypertension seems to play a major part in the production of symptoms, but how many people have the symptoms of hypertension (if any) without an increased blood-pressure?

Can we study hypertension per se, or should we not study the pattern of abnormal reactions to stress in general? (For

2. Charnley, J. Compression Arthrodesis. Edinburgh, 1953.

instance, a hypertensive in one generation may have as an equivalent a thyrotoxic in the next; or an ulcer patient may have an accident-prone brother or a bankrupt uncle.)

The reason I put forward these jottings is that when, as now, we are floundering for a better understanding, this can often be achieved by reorientating what we already know.

Clapham, Lancashire. J. A. FARRER.

EFFECT OF CONTROLLED HYPOTENSION ON CEREBRAL FUNCTION AND CIRCULATION

SIR,—Dr. Saunders (June 5) compares his $(A—V)O_2$ difference results during hypotension under anæsthesia with those in the non-anæsthetised subject. We feel his results should be compared with those in subjects under similar anæsthetic conditions without hypotension.

He states that the cerebral $(A—V)O_2$ difference represents the ratio of the cerebral metabolic demand to cerebral blood-flow. This is so, and the $(A—V)O_2$ difference varies inversely with the ability of the cerebral circulation to cope with the metabolic needs of the brain. Kety's figures [1] show the $(A—V)O_2$ difference to be 3·7 vols.% under anæsthesia. Thus Dr. Saunders's figure of 4·8 vols.% is an increase, and shows a decreased ability of the cerebral circulation to cope with the O_2 requirements of the brain.

Dr. Saunders uses Kety's figures for cerebral metabolic rate under light ether anæsthesia. These figures are based on the cerebral blood-flow obtained under light ether anæsthesia with normal blood-pressures. In Dr. Saunders's cases the blood-pressure is far from normal, and thus quite possibly the cerebral blood-flow may be changed—which is in fact suggested by the increased $(A—V)O_2$ difference.

This increased $(A—V)O_2$ difference may be sufficient to compensate for the decreased blood-flow through the brain and thus leave the oxygen uptake unchanged. Dr. Saunders is unjustified in assuming that the metabolic rate of the brain is the same under his hypotensive conditions as under normal anæsthesia, unless this is proved to be so by estimating the cerebral blood-flow under these conditions (i.e., estimating cerebral blood-flow under anæsthesia before and during the hypotension, thus ensuring that cerebral metabolism is unchanged).

We have done this.[2] Although we employ a 10° head-up tilt our level of hypotension is not so low as Dr. Saunders's—an average systolic pressure of 70 mm. Hg is obtained, and with this figure an average drop of 30% in cerebral blood-flow has been found by Kety's nitrous-oxide technique.[1]

This drop in cerebral blood-flow does not appear to be dangerous since the $(A—V)O_2$ difference (average 5·5) increases sufficiently to give the same figure for cerebral metabolism under these conditions of hypotension as in the controls under normal anæsthesia.

Department of Anæsthesia, University of Liverpool. GOUGH HUGHES
H. RIDDLE.

SIR,—Dr. Enderby has done much to champion the valuable technique of controlled vascular hypotension, but his letter of June 19, referring to Dr. Saunders's paper, contains an assumption which may be dangerous if taken at its face value.

Dr. Saunders was careful to place the limits of safety of controlled hypotension at 55–60 mm. Hg systolic "when the patient is kept horizontal or nearly so," but Dr. Enderby has gone further and inferred the safety of cerebral arterial pressures appreciably lower than this. In my view, there is no satisfactory experimental evidence that these low levels are safe, and the hints we have suggest that they are not. Experimental work in this field is extremely difficult, bedevilled as it is by varying cerebral oxygen consumptions in the conscious and anæsthetised states, but electro-encephalographic evidence in the conscious subject supports the view that 55 mm. Hg systolic is a critical level in healthy persons.[1]

Griffiths has pointed out an added danger in the tendency to a fall of blood-sugar during administration of methonium.[2] With a respiratory quotient of 1·0 and absence of carbohydrate reserve, the brain is intolerant of hypoglycæmia, and unlikely to survive the combined insults of extreme hypotension and nutritional insufficiency at the same time.

Recently my own (unpublished) findings with total oxygen consumption show that an over-all oxygen debt is incurred at pressures below 55–60 mm. Hg, under light general anæsthesia, and the debt is discharged when the pressure is restored to higher levels. While the brain cannot incur an oxygen debt (it would rather die than do so), the presence of a debt at all indicates the existence of vascular insufficiency somewhere in the body.

Controlled hypotension is of great value in saving blood-loss and operative time; but we must insist that our limits of safety err on the high side, and as far as possible are based on experiment and not assumption, or disasters will follow and a useful technique fall needlessly into disrepute. A considerable portion of the brain can be destroyed without gross disturbance, but few of us would care to risk our higher faculties under profound hypotension, even in the interests of economy.

Emsworth. P. R. BROMAGE.

PATHOGENESIS OF RHEUMATIC FEVER

SIR,—Dr. Coutu, of Montreal (June 12), criticises conclusions reached by me in the Milroy lectures of 1954 (*Lancet*, March 13). He is correct in saying that I "question the relevance, for human beings, of experiments performed on rats." In fact, I go further and question the relevance to human beings of experiments performed on any animal. The prospects of relevance to human beings increase as the strength of the analogy between a given species of animal and man increases. On this basis, in my particular argument, the guineapig provides a stronger analogy than the rat.

Dr. Coutu is also correct when he says that I question the application of Professor Selye's views to rheumatic disease. Professor Selye showed that adrenocortical activity is readily stimulated in the rat by comparatively mild forms of "stress"—a phenomenon associated with involution of lymphatic tissue, ulceration of the gut, and hypofunction of the other endocrine glands. If such an easily detected phenomenon occurred in man, it is strange that it has not been described as a postoperative complication. Stress can precipitate an attack of rheumatic fever or rheumatoid arthritis, but it does not follow that a syndrome analogous to the rat adaptation syndrome is responsible.

Dr. Coutu is again correct in saying that I question not only the application of Professor Selye's views but his use of the term "antiphlogistic," which I consider meaningless and therefore confusing. I shall attempt to clarify the issue. In my hands, cortisone effectively depresses slowly developing allergic lesions of the tuberculin type, but is without effect on the size of inflammatory lesions resulting from the intradermal injection into guineapigs of various bacteria and/or of exotoxins. I conclude that the anti-allergic activity of cortisone in this particular creature cannot be attributed to a general anti-inflammatory action. A comparable experiment in man [3] produced a similar result. It is likely, therefore, that the anti-allergic action of cortisone

1. Wechsler, R. L., Dripps, R. D., Kety, S. S. *Anesthesiology*, 1951, **12**, 311.
2. Hughes, G., Riddle, H. In preparation.

1. Bromage, P. R. *Proc. R. Soc. Med.* 1953, **46**, 919.
2. Griffiths, J. A. *Quart. J. Med.* 1953, **22**, 405.
3. Lovell, R. R. H., Goodman, H. C., Hudson, B., Armitage, P. Pickering, G. W. *Clin. Sci.* 1953, **12**, 41.

is so much greater than the anti-inflammatory action that if the latter exists its rôle in man and therapeutic significance is likely to be slight.

Dr. Coutu is confused by the term "antiphlogistic"; he provides a list of 22 references to support his contention that cortisone exerts an anti-inflammatory action. Of these, 9 are devoted to the anti-allergic action of cortisone and 7 to the effects not of cortisone but of corticotrophin. It is easy to select references to show that cortisone exerts remarkable effects which do not occur in my laboratory, but a mass of reports will not fill the rôle of a single convincing paper.

Dr. Coutu provides an excellent example of the difficulties in obtaining first-rate evidence. He worked on the effect of corticotrophin on the inflammatory response to mustard powder, and, in spite of the logical and practical objection that corticotrophin and cortisone are not the same thing, questions my work with cortisone. I spent some years working on the influence of corticotrophin on inflammatory responses. I found they were decreased, but only by certain batches of corticotrophin. Such responses bore no relation to the unitage and could not be duplicated with cortisone or with other available adrenal steroids. Moreover, the effects of corticotrophin in the guineapig were so transient that I could not distinguish between real and compensating effects. I could not therefore interpret my own results; neither can I interpret his.

National Institute for Medical Research, Mill Hill, London, N.W.7. D. A. LONG.

SALICYLATES AND ADRENOCORTICAL STEROIDS

SIR,—In your issue of May 15, Dr. Smith and his colleagues and Dr. Bayliss and Dr. Steinbeck discuss the action of salicylates on the 17-hydroxycorticosteroids in man.

As regards the first of these papers, similar work with similar results was described by Hungarian authors in 1952,[1] and by Coste et al.[2] in France in 1953, using the biological method of Cope.[3] The daily excretion of urinary cortisone-active material was unaltered during salicylate therapy.

On the other hand massive doses of salicylate commonly increased plasma 17-hydroxycorticosteroid levels in the patients of Ely et al.[4] Finally, we have repeatedly suggested that the therapeutic effect of salicylate can hardly be explained in this way.[1,5]

University Medical School, Szeged, Hungary. E. KELEMEN.

TRAVERSING WOUND OF THE HEAD

SIR,—Mr. B. H. Dawson's article of May 22, describing a traversing injury of the head with complete recovery, reminds me of a somewhat similar remarkable case.

In 1946, while serving with the Forces overseas, I was called out one afternoon to see a young soldier who had just shot himself through the head. I expected to find him dead, but instead he was lying on his bed with blood streaming from nostrils and mouth and able to talk coherently. He had been suffering from mental depression for several days and had resolved to commit suicide. He had fired one shot through the open mouth from a Smith-Wesson revolver while lying on his back with his head on a low pillow. After doing this, he was distressed to find that he could get up and walk around the room. He was pale. The pulse-rate was about 90, with poor volume. There was a small circular entry wound in the midline of the hard palate and a larger irregular exit wound in the left parietal region two inches from the midline and about the same distance behind the coronal suture. There was little comminution of bone, and hæmorrhage was mainly from the nose. He could see and hear normally. I took him several miles over imperfect roads by ambulance truck to hospital, where a careful wound toilet was carried out. The patient made an uninterrupted recovery, and several months later he was well enough to appear before a court-martial. There was no mental defect and no history of post-traumatic epilepsy. All the cranial nerves were functioning normally. It was remarkable that the left optic nerve escaped injury.

As a further illustration of the resistance of the brain hemispheres to trauma applied at right-angles to the skull, I might mention the ancient Chinese practice of passing metal needles through the head to provide an outlet for evil spirits.

Kirkuk, Iraq. R. T. S. LOUTTIT.

CERTIFICATION FOR MENTAL DISORDERS

SIR,—Many of your readers are, like myself, deeply concerned with improving mental hospitals and the care of mental illness; and they chiefly want to know how they can do this with the means at their disposal. Yet, not only do many otherwise well-informed people still seem to regard certification as an essential and inevitable part of psychiatric care, but the great majority of psychiatrists seem to be unaware that certification has been virtually abolished in both Eire and Northern Ireland. To these I commend that masterpiece of humanitarianism, the Mental Health Act (Northern Ireland), 1948.

As a medical journal is hardly the best place for a lay writer to offer medical statistics, I will confine myself to the statement that in the British Isles—excluding Northern Ireland—we have today some 200,000 mental patients certified under an Act which is archaic and should be amended. That the Act is obsolete is evident from the establishment of the Royal Commission, to which it was recently my privilege to submit evidence on this score.

Surely, we—who were first in the field with anæsthetics, antiseptics, antibiotics, and other great advances—must advance also in the field of psychological medicine. For certain, the time has come for us to separate the "insanity" of the law from the "mental illness" of medicine. Let us, therefore, follow the lead given by Northern Ireland and Eire.

Edzell, Angus. H. G. WOODLEY.

*** This subject is discussed in a leading article—Ed. L.

FŒTAL HEPATITIS

SIR,—The following case may be of interest in view of your annotation of June 5.

A 3-week-old infant was brought to this hospital with deep jaundice of 2–3 days' duration. All the evidence pointed to the jaundice being obstructive in origin. The plasma-bilirubin was of the order of 30 mg. per 100 ml. and a 24-hour specimen of fæces was entirely free from stercobilin. The alkaline phosphatase, however, was 8·5 King-Armstrong units. The blood picture was entirely normal, and the Coombs test negative.

Thus bile-duct atresia was diagnosed, and the child was submitted to laparotomy. At operation, however, absolutely nothing abnormal was found. At this stage it was decided to regard the case as one of hepatitis due to umbilical sepsis and umbilical-vein pyæmia,[1] although there was no obvious evidence of either umbilical infection or umbilical pylephlebitis. Aureomycin was accordingly given, and the jaundice regressed rapidly after 3–4 days.

A complicating feature was the development of severe anæmia of aplastic type which reached its height when the recovery from the jaundice was almost complete. At this stage there was still no evidence of hæmolysis or the presence of antibodies, and the anæmia was not considered to be due to the medication, which had been started after the anæmia was first detected. The child received a blood-transfusion,

1. Kelemen, E. *J. clin. Endocrin.* 1952, **12**, 1249. Kelemen, E., Majoros, M., Soltész, R., Tanos, B. *Disch. med. Wschr.* 1952, **77**, 1317. Kelemen, E., Tanos, B., Soltész, R., Kovács, K. *Acta endocr., Copenhagen*, 1953, **13**, 231.
2. Coste, F., Bourel, M., Delbarre, F., Weissenbach, R. *Pr. méd.* 1953, **61**, 979.
3. Cope, C. L. *Brit. med. J.* 1951, i, 271.
4. Ely, R. S., Done, A. K., Kelley, V. C. *Amer. J. Dis. Child.* 1953, **86**, 656.
5. Kelemen, E., Majoros, M. *Lancet*, 1951, i, 962.

1. Morison, J. E. *J. Path. Bact.* 1944, **56**, 531.

and since then has not looked back. After the transfusion the thymol-turbidity level rose to 4 units; previously the level had been less than 1 unit.

This case has been regarded here as one of septic hepatitis, but viral infection of the liver may have been the cause of the illness.

St. Mary's Hospital for Women and Children, London, E.13. D. MYMIN.

CHLORPROMAZINE IN STATUS ASTHMATICUS

SIR,—Status asthmaticus is not uncommon, and it may be fatal.[1] Treatment becomes very difficult when the patient does not respond to antispasmodic drugs—none of which is likely to prove of any value if subcutaneous adrenaline and intravenous aminophylline are ineffective. Sedatives, which relieve mental distress and may also lessen the asthma, may be tried; but a small dose is usually ineffective, and a larger dose may depress respiration to a degree dangerous in an anoxic patient.[2] We have ourselves seen a young woman die after two 3-grain doses of sodium amylobarbitone by mouth.

The pharmacology of chlorpromazine ('Largactil')[3] suggested that it might be valuable. It is said to have a depressant action on the cerebral cortex but not on the respiratory centre. Electro-encephalographic tracings are comparable with those of normal sleep.[4] Laryngeal and tracheobronchial reflexes mediated by the vagus nerve are depressed, and postoperative secretions are reduced.[5] In animal experiments capillary permeability is reduced and œdema of mucous membranes is prevented. Chlorpromazine also lowers the metabolic rate.

We have tried chlorpromazine in four cases:

CASE 1.—Mrs. A, housewife, aged 50. Asthma began in 1948, and on Dec. 10, 1953, she was admitted for the fifth time. She was cold, pale, cyanosed and sweating profusely; pulse-rate 160, blood-pressure 160/90 mm. Hg. She was given oxygen and intravenous aminophylline 0·25 g., intramuscular phenobarbitone gr. 3, and oral ephedrine gr. 1; but four hours later (11.30 P.M.) her condition had deteriorated. She was put in an oxygen tent, and at midnight promethazine 100 mg. was given slowly intravenously. She became slightly drowsy and the "spasm" lessened a little. At 12.15 A.M. chlorpromazine 25 mg. was given intravenously. She now went to sleep, her colour became pink and the respirations much quieter; the extremities were warm and the sweating ceased. At 12.45 A.M. the blood-pressure fell to 100/80; at 1 A.M. it rose to 120/90, and, though she was still fast asleep, the expiratory wheezing had almost gone. The pulse remained at 160 throughout (tachycardia is often an effect of chlorpromazine). Next morning she was drowsy but coöperative and the attack had ceased.

CASE 2.—Mrs. B, aged 55, had her first attack of asthma in 1952, and had since been in hospital six times. She was first admitted to Whittington Hospital at 1 A.M. on Dec. 20, 1953, with status asthmaticus of three days' duration. She was cyanosed, with widespread bronchospasm; pulse-rate 120, blood-pressure 180/90. She was given intravenous aminophylline and intramuscular phenobarbitone, but three hours later she was much worse. She was therefore given a combined intravenous injection of chlorpromazine 12·5 mg., pethidine 25 mg., and promethazine 25 mg. She went to sleep and the spasm was relieved though not abolished. Next morning she was drowsy; there were a few rhonchi but no spasm.

CASE 3.—Mrs. C, aged 31, had had asthma for ten years, and in the past year had been off work for four months, with periods in hospital. On Jan. 4, 1954, at 10 P.M., she was readmitted, deeply cyanosed and in great distress; pulse-rate 140, blood-pressure 130/90. Intravenous aminophylline was without effect, so at 10.40 P.M. she was given chlorpromazine 50 mg. She became sleepy and less distressed and the colour improved; her pulse-rate rose to 160. At midnight she was sleepy but easily roused; pulse-rate 144, blood-pressure 100/80. As there was still some spasm she was given chlorpromazine 20 mg., promethazine 20 mg., and pethidine 20 mg., together intravenously. The breathing improved and the pulse-rate fell to 120; blood-pressure was 100/70. She slept through the night and by morning the asthma had ceased.

CASE 4.—Mrs. D, aged 51, an asthmatic of many years' standing, was admitted on Jan. 4, 1954, at 8 P.M. She was deeply cyanosed, in great respiratory distress and very restless; pulse-rate 100, blood-pressure 100/50. She was given intravenous aminophylline and intramuscular paraldehyde, and was put in an oxygen tent. She remained restless and dyspnœic throughout the night, and at 7 A.M. was given phenobarbitone gr. 3 by intramuscular injection. When seen by us at noon she was semicomatose, restless, and cyanosed in spite of the oxygen tent. She was violent at times and had not been sufficiently coöperative to drink since admission. She was therefore given a combined intravenous injection of chlorpromazine 6 mg. and promethazine 6 mg. very slowly, being restrained for the purpose by three nurses; she fell asleep during the injection. The pulse-rate rose from 120 to 160 but fell again within twenty minutes to 124; the blood-pressure remained steady at 140/100. She slept quietly if not disturbed, and by 9 P.M. she was no longer cyanosed and the bronchospasm was much less though she was still confused and uncoöperative. At 11 P.M., as the effect of the paraldehyde and phenobarbitone had worn off, she was given chlorpromazine 50 mg. and promethazine 25 mg. intravenously. She fell asleep and next morning she was rational and free of the asthma.

In these cases, though the promethazine and pethidine given were probably of some value, the greater part of the improvement appeared to be due to the chlorpromazine, which enabled the patient to sleep without depressing respiration. Relief of bronchospasm was not immediate, and may have been caused as much by the adequate sedation produced as by any direct antispasmodic action of the drug. After the injections sweating stopped, cyanosis was lessened or abolished, and the extremities became warmer. Although there was always tachycardia, the heart's action was not irregular and fall of blood-pressure was only slight and transient.

In our view parenteral administration of chlorpromazine should at present be restricted to the more severe cases; but we have given it by mouth in a few mild cases with some apparent benefit.

The first three cases were under the care of Dr. A. L. Jacobs and the fourth of Dr. M. G. C. Ashby, consultant physicians. We are grateful to them and to Dr. O. H. Belam, consultant anæsthetist, for their help and advice.

Whittington Hospital, London, N.19. K. C. ROBINSON
D. ZUCK.

BARBITURATE POISONING

SIR,—From time to time the question of how best to treat acute barbiturate poisoning is raised. Nabarro[1] has emphasised the importance of restoring consciousness promptly by administering amphetamine, in order to prevent bronchopneumonia. Others believe that expert use of the bronchoscope and assisted respiration are sufficient until the effect of the drug wears off. In the following case the patient had taken an unknown amount of sodium amylobarbitone ('Sodium amytal') and phenobarbitone.

A depressive patient, aged 59, was seen at 8.45 A.M. by his doctor. He was unconscious with shallow respirations, small fixed pupils, and absent corneal, limb, and abdominal reflexes. He was given 6 mg. of picrotoxin and was then admitted to the Lymington and District Hospital under the care of Dr. R. J. McGill. In the next 3 hours he received a total of 60 mg. of picrotoxin, which resulted in generalised twitching and turning of the head, relieved by a small dose of thiopentone. Intravenous methylamphetamine was started, and at the end of 6½ hours he had been given 80 mg. The pupils

1. Earle, B. V. *Thorax*, 1953, **8**, 195.
2. Houston, J. C., De Navasquez, S., Trounce, J. R. *Ibid*, p. 207.
3. Courvoisier, S., Fournel, J., Ducrot, R., Kolsky, M., Koetschet, P. *Arch. int. Pharmacodyn*, 1953, **92**, 305.
4. Terzian, H. *Rassegna Neurol. veg.* 1953, **4-5**, 211.
5. Foerster, S., Foerster, E., Maier, A., Blum, H. *Curr. Res. Anesth.* 1952, **9**, 250.

1. Nabarro, J. D. N. *Brit. med. J.* 1950, ii, 924.

became dilated and only the abdominal reflexes were absent. His blood-pressure was 136/80 mm. Hg and did not rise above 150/60 subsequently. He received 150 mg. of the drug in the next 4½ hours, after which he awoke and seemed to recognise his relatives. Dosage was continued with 330 mg. over another 4½ hours, at the end of which he was fully awake and able to eat without assistance. The total dose of methylamphetamine was 560 mg. over 15½ hours. For the next 24 hours he had decreasing visual hullucinations and was excitable though coöperative. Additional treatment during coma included oxygen by nasal catheter, rectal saline, and 1 million units of penicillin.

This patient was never on the verge of convulsions with methylamphetamine, as he was with picrotoxin; his blood-pressure remained normal. It seems safe to give large doses of methylamphetamine over a comparatively short time to patients in deep coma. Poe and Karp [2] describe a case in which a total of 520 mg. was given, but no times are stated.

Poole Hospital,
Nunthorpe, Middlesbrough. C. F. HINGSTON.

DEMONSTRATIONS OF HYPNOTISM

SIR,—The Hypnotism Act of 1952 was initiated and passed to curb the dangerous and degrading spectacle of stage hypnosis and to stop the abuse of a recognised medical technique as entertainment for the public. Are we any further now that the Act is a fact? Today we read [3] of a television demonstration of tooth-pulling by a dentist, using hypnosis. Yesterday we read [4] of a layman who publicly demonstrated hypnosis on members of his audience and who was prosecuted under the Act and acquitted because he gave a "lecture" and no collection was made. We repeatedly read in the lay press articles by or about certain doctors and others practising hypnotism. This conduct should not be permitted and can only be controlled by a stronger Act or adequate action by a disciplinary body.

If hypnotherapy is to achieve its correct status and position in medicine, it must not be abused. We are not asked to witness the extraction of teeth under thiopentone or nitrous oxide on television, for it would not be tolerated by medical authority. Could we not expect the same consideration for a valuable therapy even now in the experimental stage?

London, W.1. GORDON AMBROSE.

EXERCISE TESTS DURING TREATMENT OF HYPERTENSION

SIR,—In your issue of Oct. 3, Dr. Vagn Rønnov-Jessen reported 2 cases of hypertension in which, after the administration of hexamethonium, a fall in blood-pressure set in after physical exertion. He postulated that the change of blood-pressure following exertion was a guide to the level to which blood-pressure should be reduced by treatment.

We should like to report the results of similar tests on the effect of exercise on systolic and diastolic blood-pressure in normal and hypertensive individuals before and after the administration of tetraethyl ammonium bromide (T.E.A.B.). Our results partly confirm those of Dr. Jessen.

88 tests were performed on 73 people; 35 had a normal blood-pressure, 28 had essential hypertension, and 10+ had renal hypertension. Blood-pressure and pulse-rate were taken in the lying position until the resting level was reached. The patient then performed 20 deep knee-bends in one minute; immediately afterwards, the blood-pressure and pulse-rate were again recorded every minute for a period of at least 10 minutes. After a prolonged rest, 0·3 g. of T.E.A.B. was injected intravenously, and the above exercise test was then repeated.

We found that the systolic pressure of hypertensive and normotensive individuals rose after exercise. But the diastolic pressure reacted differently in hypertensive and normotensive persons: in the normotensive it almost invariably decreased in the minutes immediately after exercise (out of a total of 41 observations, only 4 showed an increase); in essential hypertension it usually rose (a decrease was noted in only 5 out of 36 observations). The difference between the reaction of the two groups was significant by the "t" test.

Exercise after T.E.A.B. generally increased the diastolic pressure of hypertensive patients in the same way as before, the increase in the mean value being rather greater; in normotensive patients, however, the previous decrease was no longer observed.

These findings are opposed to the conclusion of Stevenson et al.[1] that the blood-pressure of patients with essential hypertension reacts differently from that of normotensive people because of psychic factors and not as a result of exercise.

The cardiac output per minute in both hypertensive and normotensive patients is known to increase as a result of exercise, so the different behaviour of diastolic pressure in the two groups can only be attributed to the fact that exercise produces a greater fall in the peripheral resistance of normal individuals.

Although exercise affected the diastolic pressure less after the administration of a ganglion-blocking agent, in 2 cases exercise was followed by a substantial drop in blood-pressure and a state of semi-collapse, which confirms Dr. Jessen's observations.

G. CZONICZER
T. ZSÓTÉR
University of Szeged, Hungary. ZS. SEBÖK.

THE AFRICAN MIND

SIR,—Your annotation of Jan. 30, under the title Comparative Psychiatry, discusses the psychiatric section of Dr. Carothers's monograph on The African Mind in Health and Disease. His observations are based on an earlier study,[2] which was devoted to a careful analysis of the cases admitted over a period of 5 years to the African mental hospital in Kenya, and which raises, as you suggest, many interesting points of comparison between types of mental disease found in European and African communities.

This section involves, however, only one chapter in Dr. Carothers's monograph—a chapter which will probably only attract the interest of specialists in this field. A chapter which will, I imagine, arrest the attention of a wider group of readers is that on psychology, in which the author develops his views on the African mind in health. These are also based upon a previously published study,[3] but one which unfortunately falls far short of the earlier one in standard of scientific inquiry. The evidence, in fact, which Dr. Carothers presents in support of his view that African behaviour resembles that of a leucotomised European psychopath consists of 33 personal and subjective anecdotes purporting to depict "unreliable behaviour in Africans." For example, one of these (and not the most surprising) reads as follows:

> "I put my shoes to be mended in my shopping basket the night before so that I shall remember to take them to the cobbler the next day; the house-boy takes them out, cleans them, and puts them elsewhere, though he might assume that they had been put in the basket for some purpose."

Readers—and particularly those with some experience of East African mores—will be able to think of many explanations for this alleged shortcoming, but the point I wish to stress is that this is not the kind of evidence upon which serious conclusions can be based.

In short, the contrast between the methods by which Dr. Carothers has arrived at his psychiatric and at his

2. Poe, M. F., Karp, M. *Curr. Res. Anesth.* 1948, **27**, 176.
3. *News Chronicle*, May 25, 1954.
4. *Brit. med. J.* May 8, 1954, p. 1103.

1. Stevenson, I. P., Duncan, C. H., Flynn, J. T., Wolf, S. *Amer. J. med. Sci.* 1952, **224**, 286.
2. Carothers, J. C. *J. ment. Sci.* 1948, **93**, 548.
3. Carothers, J. C. *Ibid*, 1951, **97**, 12.

psychological conclusions is so great that I think it would be regrettable if readers were to be led by the evident erudition of his monograph, or by the *imprimatur* given to it by W.H.O., to regard both parts as of equal scientific validity.

Kampala, Uganda. J. McFIE.

DIET AND CORONARY DISEASE

SIR,—Professor Duguid (May 1) distinguishes two forms of atherosclerosis but says: "in both processes the mechanism . . . is the same; solid matter is deposited on the intimal surface and in due course covered with endothelium and incorporated in the intima." Why not accept this as the essential pathogenesis, and regard narrowing as something additional?

A study of the pathology of mental disease (where the cardiovascular system is oftener at fault than the central nervous system) gives support to the mural thrombi origin of atheroma as put forward by Professor Duguid. In addition I have illustrated streptococci [1] attached to vessel walls; and atheroma localised to an area contiguous to a sphenoidal empyema,[2] presumably where phagocytes and red-cell clumping had adhered.

It is often possible to see in histological sections that local vessel dilatation is the result of an atheromatous process, and I generally find that extreme atheroma has fixed the vessel in a state of dilatation.[4] Where, however, thrombosis is complete as in Professor Duguid's figs. 1 and 2, narrowing might be expected, as also where the adventitia becomes involved. In one case the internal carotid artery was reduced to a fibrous cord.[3] (This patient died from thrombosis of the superior mesenteric artery.)

The effects of occlusion of the small coronary vessels are not, as Professor Duguid states, negligible. Acute cardiac failure or local heart-wall rupture [5] occurs when anastomotic vessels cannot relieve an additional small occlusion or spasm.

Atheromatous ulcers release lipoid into the circulation,[6] so a high blood-cholesterol level may be a sequel as well as a cause of atheroma.

Birmingham. F. A. PICKWORTH.

SIR,—I cannot agree with Professor Duguid (June 5) that restricted fat consumption "could not have been the factor responsible for the discontinuity in the recorded death-rates beginning to appear as early as 1940."

The following figures [7] show the supplies of "fat from all sources moving into consumption in the United Kingdom" as a percentage of the pre-war (1934–38) consumption:

1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
93	87	91	89	95	89	86
1947	*1948*	*1949*	*1950*	*1951*	*1952*	
82	85	93	101	97	94	

It will be seen that the most severe fat restriction occurred after the end of the war (not in the later war years as stated by Professor Duguid). My graph of coronary-disease death-rates (May 22) shows that the discontinuity first became evident in 1941 (not 1940), by which time the fat consumption had fallen to 87% of the pre-war level. Further it must be remembered that the fat-consumption figures are averages for the whole population and that the rationing of fats (which began early in 1940) would cut the consumption of those persons with the highest intake while those with the lowest consumption would be little affected. In my opinion all this fits in with the theory that restricted fat consumption could be the cause of the discontinuity in the recorded death-rates from coronary disease.

1. Pickworth, F. A. *Z. ges. Neurol. Psychiat.* 1932, **141**, 420; fig. 3.
2. Pickworth, F. A. Chronic Nasal Sinusitis. London, 1935; fig. 16, 1952; plate II, p.
3. Pickworth, F. A. *Nursing Mirror*, Oct. 18, 1947, p. 45; fig. 2.
4. Pickworth, F. A. New Outlook on Mental Diseases. Bristol. 1952; plate II, o and r.
5. *Ibid*, plate II, l.
6. *Ibid*, plate II, l.
7. *Ministry of Food Bulletin*, Sept. 19, 1953.

A possible reply to my argument is, Why is the discontinuity in the death-rates more or less confined to the war years, although the fat consumption fell still lower after the war and rationing was continued until this year? My answer to this is that I do not think the discontinuity is confined to the war years, but that it has continued long after the end of the war. Consideration of the trend of the death-rates from coronary disease is complicated by the steep upward trend probably largely due to changing fashions of certification and similar causes. This makes it difficult to determine the true extent of the war-time discontinuity, while there is also the further difficulty that the national statistics of deaths from all forms of heart-disease are notoriously difficult to interpret owing to what has been referred to as "a good deal of switching of diagnostic labels." Elsewhere [8] I have tried to deal with some of these rather involved questions and have given a number of graphs of the death-rates from several different forms of heart-disease. Here I would say only that during the years 1931–49 the death-rates (by age-group) for degenerative heart-disease as a whole rose fairly steadily up to 1940, fell steeply until 1942 or 1943, and thereafter rose again, but at a slower rate than before 1940.

On the biological evidence for and against the fat theory, I am not competent to comment; but, if I understand it correctly, a possible interpretation is that a high consumption of fat may be a cause of coronary disease, and I feel that this interpretation is strengthened by the known trends of the death-rate and the consumption of fats since 1940.

Harrow, Middlesex. R. H. DAW.

CLINICAL TESTS FOR KETONURIA

SIR,—Thank you for publishing the most enlightening paper by Dr. Nash and his colleagues (April 17). The nitroprusside-tablet test is of particular interest. I strongly deprecate the disgusting business of old-fashioned urine-testing, as still practised in such semi-public places as hospital clinics and doctors' consulting-rooms.[9] It is very much to be hoped that tablet tests will soon become the generally accepted routine when testing urine for pH, reducing substances, ketone bodies, and bile pigments.

It is a pity that Dr. Nash and his colleagues do not tell us the exact composition of these nitroprusside tablets. It is also a pity that obscurity should have been allowed to creep into an otherwise remarkably lucid paper, over the chemistry underlying the tests described. It is not quite correct to state that some consider only acetone gives a purple coloration with nitroprusside, whereas others consider both acetone and aceto-acetic acid give it.

Actually, it is a very simple matter. Compounds with a ketonic grouping in a certain position give this reaction—e.g., acetone, which is dimethylketone $(CH_3)_2.C=O$. Aceto-acetic acid, however, exists in solution as an equilibrium mixture of two slightly different forms, known respectively as keto and enol tautomers. The keto form has the following configuration:

$$CH_3.C(=O).CH_2COOH.$$

With a shift in the position of the double bond, caused by the migration of one hydrogen atom, the enol form is produced which has the following configuration in which, for clarity, I have asterisked the hydrogen atom which has migrated:

$$CH_3.C(OH^*) = CH.COOH.$$

The keto form has a structure closely akin to that of acetone. This form—and this form only—reacts, like

8. *J. Inst. Actu.* (in the press).
9. Adams, A. V. *Med. World, Lond.* 1952, **76**, 464.

acetone, with nitroprusside, as might be expected. However, by the law of mass action, in proportion as the keto form is used up in the reaction so will more be regenerated from the (non-reacting) enol form.

Likewise, the enol form has a hydroxyl group closely resembling that of such compounds as phenol and salicylic acid. It is the enol form—and this form only—that gives the Gerhardt reaction with ferric chloride, as do phenol and salicylic acid. It is precisely this that accounts for the interference with the Gerhardt test caused by the excretory derivatives of many commonly used drugs. Distinction from these is possible because aceto-acetic acid is readily hydrolysed on boiling, either to acetone and carbon dioxide or to acetic acid, according to the pH of the solution.

Heathfield, Sussex. ADRIAN V. ADAMS.

SIR,—With reference to the article by Dr. Nash and his colleagues and subsequent letters (May 1 and 15), I should like to draw attention to a simple test for distinguishing between true and false positive Gerhardt reactions.[1]

1 drop of concentrated nitric acid is added to 1 inch (about 4 ml.) of urine in a test-tube, and the mixture is boiled for one minute. After cooling thoroughly, 1/2 inch (about 2 ml.) 10% ferric-chloride solution is added.

Aceto-acetic acid is completely destroyed by this procedure, and the reaction will now be negative. Drugs will still give a positive reaction.

Department of Physiology,
University of Cape Town. H. ZWARENSTEIN.

ACUTE APPENDICITIS IN LATE PREGNANCY

SIR,—In his interesting article last week Mr. Parker rightly stresses the difficulty of deciding whether the source of tenderness is uterine or extra-uterine. No single sign is likely to clinch the diagnosis in an abdominal emergency during pregnancy, but the sign described by me [2] may be found useful in this connection :

"With the patient lying straight on her back, the examining fingers find the area of maximum tenderness to pressure on the abdominal wall. While the fingers remain in contact with that area without altering the intensity of pressure they are exerting to elicit pain, the patient is made to turn over on to the opposite side so that the plane of the anterior abdominal wall is approximately vertical. The pain produced by the pressure of the fingers will be less or will have entirely disappeared if the lesion is uterine and has fallen away from the examining fingers—'shifting tenderness' (concealed accidental hæmorrhage, Case 3, or degenerated uterine fibromyoma, Case 4); pain sensation will be unaltered if the lesion is extra-uterine—'fixed tenderness' (due to appendicitis, Cases 1 and 2, renal or gall-bladder disease, ovarian cyst with twisted pedicle, diverticulitis)."

Bournemouth. N. ALDERS.

B.C.G. VACCINATION

SIR,—After reading that in the U.S.S.R. children are vaccinated repeatedly from birth till leaving school,[3] I would like to describe my experience of ordinary intradermal injections of 1 ml. and of multiple puncture by Professor Heaf's six needles.

By the end of 1952 I had done 2500 ordinary vaccinations with only 1 case of adenitis and half a dozen with ulcers 12–15 mm. in diameter. However, as even the mildest of vesicular reactions takes some considerable time to heal and in many cases ulcers 6–8 mm. in diameter last for months and may cause parents to withhold permission for vaccination, I thought I would try multiple puncture.

Early in 1953 I applied this method to 40 children—the technique was to put a drop of B.C.G. ordinary intradermal strength (0·25 mg. per ml.) on the arm and release the spring of the M.P. apparatus half a dozen times. On subsequent test 35 gave a positive Mantoux reaction, although the local reaction on the deltoid area consisted simply of numerous tiny papules 1·5 mm. in diameter and height. The reaction was not so strongly positive as after intradermal injection. Hence doubt arose as to the value of this method and as to whether the conversion would persist for any length of time. Now after fifteen months all except 2 of the 22 children re-tested have given positive reactions varying from very slight to quite definite.

I had requested permission to use B.C.G. 20 mg. per ml., or dried B.C.G. which I could dilute to the required concentration; but the authorities would not countenance this experiment.

It seems to me that if this simple, safe, and rapid procedure can produce allergy lasting two years it will appeal to a much wider public and prove unobjectionable to parents.

Stornoway, Lewis. R. STEVENSON DOIG.

1. Zwarenstein, H. *J. Lab. clin. Med.* 1945, **30**, 172.
2. *Brit. med. J.* 1951, ii, 1194.
3. See *Lancet*, May 22, 1954, p. 1088.

AN AMERICAN IN BRITAIN

SIR,—I was greatly discouraged and depressed that a journal with the standing of *The Lancet* would publish such a statement as that of Dr. Cort in the June 19 issue. Perhaps it is because of your unfamiliarity with American military draft procedure. It would also appear that the University of Birmingham has been misled. This type of reporting is more characteristic of the lay press.

In America medical students are "deferred" from military service during their undergraduate study and for one year afterward while in the internship or other advanced study. Please note that they are deferred and not "exempt." At the end of this time they are, if physically, mentally, and morally fit, commissioned in the appropriate service for a period of 21–24 months. Loyal citizens do not attempt to evade this obligation. While discharging this obligation several of Dr. Cort's classmates have become casualties in such places as Korea in an attempt to keep the world free so that research may continue.

Dr. Cort's statement is a cleverly worded piece of evasion and diversion which may mislead the British doctor, but it will certainly not confuse any American physician. The issue at hand is not Communism as he would like for you to believe; but instead, it is evasion of military service, or to use the American vernacular simply "draft dodging." Without attempting to analyse all of his statements I shall comment on only a few.

He mentions several colleagues who were dismissed from their jobs because of Communism. This is untrue. These men were in junior positions and when the terms of their appointments expired they went into the private practice of medicine. He recalls one who remained as being defendant in a suit brought by the State of Massachusetts for "violation of his oath." The fact that one of his colleagues did remain attests to the fact that Communism was not an issue.

He also mentions that upon his return to America he will be subject to unemployment. This is not true. He is eligible to obtain a licence and enter into the practice of medicine in any of the 48 States, territories, or possessions. If, of course, he expects to obtain a professorship, he may well be unemployed.

As to the loss of citizenship, it is impossible to deprive a natural-born citizen of his citizenship. A naturalised citizen may be repatriated if his citizenship was obtained on the basis of fraud.

As to the 5–10 year prison sentence he mentions, this can be given only upon conviction of a felony. If a felony is involved, he will have ample opportunity to defend himself before an impartial jury of twelve. If the decision is adverse, he may proceed to a court of appeals and in an exceptional circumstance he may even advance to the United States Supreme Court. To put the matter more simply, an honest citizen has nothing to fear.

The proper thing for Dr. Cort to do is to stand up straight on his hind legs like a man and volunteer for his

military service without hiding behind such statements as "not legally binding," the tolerance of the British Government, and any emotion he may elicit from the ill- or mis-informed public. If at the end of his service he so desired he could return to England as an immigrant if the country would still accept him.

As to his immediate future I am sure that between the American embassy and the Home Office justice will be obtained. The press would do well to stick to the official announcements of these bodies.

AN AMERICAN DOCTOR IN ENGLAND.

ROSE SIMMONDS MEMORIAL FUND

SIR,—In Decemoer, 1952, you published an appeal for contributions to the above fund.[1] The object was to provide an educational fund which, through the British Dietetic Association, would offer scholarships to students to train as dietitians, or prizes to students in training.

A sum of £370 has now been contributed. This money has been invested, and the trustees have decided that prizes shall first be available in the autumn of 1955.

DOROTHY S. RUSSELL — E. P. SKINNER, Chairman.
H. G. WIMBUSH — E. M. GAGE, Hon. treasurer.
W. R. S. RITCHIE
British Dietetic Association.

Medicine and the Law

Death after Tonsillectomy

AT an inquest on a 7-year-old girl at Barnet on June 14 the coroner criticised the emergency arrangements at a local hospital.[2]

The child's tonsils were removed on May 26 at St. Stephen's Hospital; there were no complications at operation but some four or five hours later, at 8.45 P.M., hæmorrhage was noticed. The surgeon, who was at Barnet General Hospital, was kept informed; he ordered an injection which was given at 9.15 P.M., and after a further message went to see the child at 10 P.M., when he ordered her removal by ambulance to Barnet General Hospital. There he operated to stop the hæmorrhage and gave blood-transfusions, but the child died.

The bleeding was noticed at a time when day staff was handing over to night staff, and the surgeon was not available on the premises. As there were no facilities at St. Stephen's for the operation and blood-transfusion, the child had to be removed by ambulance, all of which caused delay.

Recording a verdict of death by misadventure the coroner said that the arrangements were perhaps inadequate for an emergency of this sort and he would bring the matter to the attention of the authorities responsible.

Public Health

First Quarter in Scotland

IN the quarter ended March 31 this year [3] the birth-rate in Scotland was 18·6 per 1000 population, which was 0·5 above the rate for the corresponding quarter of 1953 and 0·1 above the average in the previous five years. Stillbirths amounted to 25 per 1000 total births. The death-rate was 14·3 per 1000 population—0·6 more than in the corresponding quarter of 1953 but 0·8 below the five-year average. The infant-mortality rate was 38 per 1000 live births, and the neonatal-death rate 24 per 1000 live births. Deaths from tuberculosis amounted to 31 (respiratory 28) per 100,000 population, compared with 32 (27) in the first quarter of 1953 and a five-year average of 56 (49).

1. See *Lancet*, 1952, ii, 1187.
2. *Barnet Press*, June 15, 1954.
3. Quarterly Return of the Registrar-General, Scotland: Births, Deaths, and Marriages registered in the quarter ended March 31, 1954. H.M. Stationery Office. Pp. 32. 2*s*. 6*d*.

Obituary

CHARLES COLGATE HOLMAN
M.A., M.B. Camb., F.R.C.S.

Mr. C. C. Holman, emeritus surgeon to Northampton General Hospital, died on June 17 at the age of 69.

He was born at East Hoathly, where his father and his grandfather were both in general practice. From Eastbourne College he went to Caius College, Cambridge, where he took the natural sciences tripos in 1905. Following a family tradition he finished his medical education at Guy's, qualifying in 1908 and graduating M.B. in 1909. After serving as house-surgeon at Guy's he held other resident appointments at Addenbrooke's Hospital, Cambridge, at the Norfolk and Norwich Hospital, and at Brighton and Hove Hospital for Women. In 1912 he took his F.R.C.S., and the same year he began his long association with Northampton when he received a house-appointment at the General Hospital. Soon afterwards war broke out and he joined the R.A.M.C., serving for a year in Mesopotamia.

On his return to Northampton he became assistant surgeon to the General Hospital in 1919, and he later joined the staffs of the Manfield Orthopædic Hospital and the Kettering and District General Hospital. When he retired from the staff of the Northampton General Hospital in 1952 he was appointed emeritus surgeon. During his too short retirement he continued his habit of contributing cogent and incisive letters to our columns, and earlier this year he began his last article with the characteristic words: "After forty years' work I am still seeking the answer to the following questions about cancer of the breast. . . ."

R. O. L. writes: "Charles Holman was a modest man who shunned publicity except when he had something of real importance to say. For this reason his merit as a surgeon may not have received full recognition outside his own area, and only those who worked beside him came to know and appreciate his true worth. Thirty-three years of consulting work gave him a vast experience which encompassed the whole range of general surgery and at one time included gynæcology and orthopædics. In 1939 he formed the first fracture unit at Northampton General Hospital, and from then until 1946, in addition to his general work and with the aid of one houseman, he dealt with all fractures coming to the hospital. His capacity for work was enormous: holidays meant time lost from work and it was an exception for him to be away more than ten days in any year. In operating he was sound and generally conservative; in judgment sure, and in criticism generous.

"A quiet thoughtful man, he kept meticulous records; he also read widely in the medical journals, and his contributions to them were always well balanced and valuable since they were based on his own wide experience. His recreations were simple; lawn-tennis at which, despite a disability resulting from poliomyelitis in childhood, he was an enthusiastic performer and a difficult man to beat, and bridge which he enjoyed and took not too seriously.

"His name was a household word in Northamptonshire and North Bucks and he is mourned by all who knew him."

Mr. Holman is survived by his second wife, Miss V. Lewis, whom he married in 1924. Of the two sons of his first marriage to Miss V. E. Foxell, who died in 1921, one is a doctor.

EDWARD JAMES BOOME
T.D., M.B. Birm., M.R.C.P.

Dr. E. J. Boome, consultant in speech therapy to the London County Council, died on June 12 while on holiday in Devon.

He graduated M.B. from the University of Birmingham in 1907. After holding house-appointments in Birmingham at the General Hospital and the Queen's Hospital, he took the D.P.H. in 1912, and the following year he joined the public-health service of the London County Council. During the 1914–18 war he served in France as a Territorial medical officer, reaching the rank of major and being mentioned in despatches. On demobilisation he

returned to his post with the L.C.C. as assistant school medical officer and his work ranged widely over school medicine. He was an authority on the ascertainment of defective children. For a time he was visiting medical officer to the Farmfield Institution for Mental Defectives and lecturer to the nursing staff. In 1934 he was promoted to be a principal assistant medical officer. A pioneer in the study of speech defects, he was a founder fellow of the College of Speech Therapists. He was responsible for the development of speech therapy in the council's service and he became its consultant on the subject. He was the joint author of several textbooks on the nature and treatment of speech defects, including *Relaxation in Everyday Life* (1938) and *Abnormal Speech* (1939). For several years he also shared in the examination of the council staff, bringing to the work clinical skill and charm. His commanding presence, wit, and courtesy will make him difficult to replace.

Mrs. Boome survives him.

Dr. A. L. P. PEENEY

A. V. N. writes: "His fellow consultants will note the great gap caused by Peeney's absence from that mecca for friendly and constructive clinical chat—the warm and welcoming clinical pathology laboratory in the Queen Elizabeth Hospital at Edgbaston. His persistent ability to gather his clinical colleagues together for discussion on research work, and his inclination to leave himself somewhat in the background, were characteristic of the quiet unobtrusiveness of his daily life and work. Many resident officers and medical students have reason to be grateful for the trouble and care he gave to their laboratory work and instruction. Those of us who knew him more intimately came to understand a sound philosophic mind and a man who never withheld kindness and sincere help."

Dr. A. J. M. BUTTER.—Our obituary notice (June 12) contained a personal tribute from J. A. B. Y. This was a shorter and altered version of what was sent to us; and, as the writer informs us that he would not have wished it to appear in that form, we must express our regret that he had no opportunity to correct a proof before publication.

Appointments

BILLINGHURST, MARGARET A., M.B. Lond., D.O.M.S.: refractionist (S.H.M.O.), Westminster Hospital, London, S.W.1.
DREW, D. W. A., M.R.C.S.: anæsthetic registrar, South Devon and East Cornwall Hospital, Plymouth.
EDGAR, WILLIAM, M.B. Edin., D.P.H., D.C.H.: deputy M.O.H., and deputy school M.O., Luton.
GLOVER, J. R., M.B. Camb.: M.O., Westinghouse Brake and Signal Company, Ltd., Chippenham, Wilts.
KENNEDY, C. C., M.D.: consultant clinical pathologist, Belfast City Hospital.
MCGRATH, S. D., M.R.C.P.I., D.P.M.: physician in charge of clinical research, St. Patrick's Hospital, Dublin.
PRESTON, A. E., B.M. Oxfd: deputy director, blood-transfusion service, Oxford.
WINN, J. M., B.A. Camb., M.R.C.P., D.M.R.D.: consultant radiologist, Leeds General Infirmary.

Leeds Regional Hospital Board:

COXON, J. G., M.B. Lond., F.R.C.S.: part-time consultant in general surgery, Dewsbury and Halifax areas.
DONOVAN, J. F., M.R.C.S., D.P.M.: consultant psychiatrist and physician-superintendent, Broadgate Hospital, Beverley.
NEWCOMBE, JOHN, M.B., D.P.M.: consultant in psychiatry, mental deficiency hospitals and hostels, Hull and East Riding areas.
SMART, G. A., M.B. Glasg.: asst. chest physician (S.H.M.O.), chest clinics, hospitals, and sanatoria, Hull area.
WELEMINSKY, ANTONIN, M.D. Prague: asst. chest physician (S.H.M.O.), chest clinics, Pontefract, Goole, and Selby areas.

Liverpool Regional Hospital Board:

EDWARDS, K. C. S., M.R.C.S., D.P.M.: whole-time consultant psychiatrist, Deva Hospital.
GORE, C. P., M.D. Dubl., M.R.C.P.I., D.P.M.: whole-time consultant psychiatrist, Rainhill Hospital.
MARKS, K. L., M.B. Edin., M.CH.(ORTH.) Lpool, F.R.C.S.E.: consultant orthopædic surgeon, Chester and central Wirral areas.
STEAD, A. L., M.D. St. And., F.F.A. R.C.S.: part-time consultant anæsthetist, Liverpool city area.
WALKER, ERIC, M.D. Lpool, D.P.H., D.M.R.D.: part-time consultant radiologist, East Liverpool area.

The Hospital for Sick Children, Great Ormond Street, London:

CARTER, C. O., B.M. Oxfd, M.R.C.P.: part-time medical geneticist (S.H.M.O.).
CLARK, WENDY A., M.B. Lond., F.F.A. R.C.S.: junior resident anæsthetist.
O'MEARA, P. A., M.B. N.U.I., D.L.O.: registrar, E.N.T. department.
SLOMAN, LIZBETH, M.D.: house-physician to Professor Moncrieff.

Notes and News

OUTPATIENT DEPARTMENTS

AT a conference held by the Association of Hospital Management Committees in Scarborough on June 17–19, the Marquess of Normanby (chairman of the board of governors of King's College Hospital) said that, except for casualties, the outpatient department should be reserved for consultative and treatment clinics, to which patients must be referred by the general practitioner: "we should at all costs try to prevent the hospital entering into direct relationship with a member of the public, without going through the general practitioner." Meetings between hospital consultants and general practitioners helped to abate the pressure on this department. Consultants, for their part, might "weigh up in their hearts the value of their membership on each committee as set against the value of their regular and punctual attendance at outpatients." Those in charge of outpatient clinics should give priority to this work over any other, except emergency calls in the wards. As regards the structure of the department, "I am personally not at all impressed by palatial surroundings, but I am deeply impressed if there is someone at hand to discuss any problem arising or to explain to the patient the cause for delay or the cause for any other thing that has gone wrong." Outpatient departments contained much expensive equipment, which should be fully used. It was surely not impossible to envisage a modification of the idea of health centres based on the use of hospital outpatient departments in hours when the hospital doctors were not in attendance.

Mr. G. L. Thompson, as a consultant, spoke of the need for "simple" prescribing not only for inpatients but also for outpatients. Mr. S. Clayton Fryers (formerly chief administrative officer, Leeds United Hospitals) said that nine out of ten complaints came from dissatisfied outpatients. He did not know whether it had been established that the patient had a right to see a consultant: a large number were seen by more junior doctors. Beds might be saved if outpatients were examined thoroughly by consultants; commonly more junior members of the staff felt that they should admit patients, and it might thus be economic to have more consultants.

OUTPATIENT WAITING: THE OTHER SIDE

PATIENTS who do not keep their appointments were the subject of strong comment at a meeting of the Bournemouth and East Dorset Hospital Management Committee reported in the *Bournemouth Times* of June 4. Further facts were given by Mr. E. J. Whitney, secretary of Poole Hospital, in an interview with the *Poole Herald* (June 9). This hospital's house-committee, he said, had long been much concerned to reduce the time that outpatients waste, and by last October had managed to cut the average waiting-time to half an hour. But consultants complained that patients often ignored their appointments, and a check made over a period of five weeks showed that this was done by 88 new patients and 292 old patients—i.e., some 10% of all the patients treated during the period. "Not one of them gave us any warning, or contacted us in any way, in spite of the fact that the appointment card specifically asks them to notify us immediately if for any reason they are unable to attend." The time wasted in this way could have been used to reduce the delay of several weeks before new patients can be seen in some of the departments. Mr. H. R. Rees, deputy group secretary, stated that little could be done except to advise the doctor who fixed the appointment. "Then it is up to him to ask the patients why they did not turn up."

SICK-LEAVE FOR HOSPITAL STAFFS

Mr. G. A. Paines, secretary of the Croydon Hospital Management Committee, comments in the *Municipal Journal* (May 21) on "the apparent decline" in the health of some hospital employees of all grades since the inception of the National Health Service in 1948. "Matrons and hospital secretaries," he declares, "have often been worried, and at times distraught, particularly on the days following public holidays or weekends, by the increased incidence of periodical sickness, which has multiplied each year since 1949." In one group of hospitals, employing under 2000 people, the position became so serious that in 1952 the management committee decided on a special investigation.

An establishment subcommittee, comprising a doctor, a nurse, and a trade-unionist, all members of the management committee

looks into the periodical absences of all grades of staff and then recommends: (*a*) that the case be reviewed again in three, six, or twelve months; or (*b*) that the employee be sent for medical examination, after which his own doctor has the right to submit an opinion to the medical referee; or (*c*) where the medical referee has previously advised that ill health makes a person unsuitable for employment in his present job, and there is no alternative employment available, that reasonable notice be given to terminate employment.

The matter is then considered by the establishment committee, of which the chairman is a doctor not employed in the National Health Service. The investigating group, after further consideration, makes a recommendation to the management committee. A special committee to hear appeals, consisting of three members of the management committee who ordinarily have nothing to do with staff matters in the group, has been set up.

Since this procedure has been in operation 45 employees have had their services terminated. The management committee decided to send for medical examination those members of the staff nominated by the establishment subcommittee.

In the first ten months of the new arrangement the total amount of periodical sick-leave lasting three days or less (without medical certificate) fell by 65%, and sick-leave of over three days (with medical certificate) by 22%.

The inquiry revealed that in 1951 all sickness had increased from the 1947–48 levels as follows: nursing 60%; ancillary staff 25%; other staff 300%. Absences of one, two, or three days without medical certificate had increased by 200%. In 1953 non-resident staff averaged 33% more total sickness than resident; while full-time non-resident staff had a higher proportion of sick-leave than part-timers. Full-time non-resident nurses had 50% more sick-leave than residents; similarly sick-leave among non-resident ancillary staff was 250% greater, and among part-time ancillary staff 300% greater.

Mr. Paines concludes that other employing authorities may wish to collect similar statistical information. "The comparisons may surprise."

A REGISTER OF BENEFITS

THE Ministry of Pensions and National Insurance have revised their helpful booklet, *How, When, and Where to Claim Benefit*, which gives a clear summary of the different benefits to which the sick, injured, unemployed, pregnant, or ageing citizen is entitled. As its title promises it gives succinct instructions as to how and where he (or she) should set about making his claim, and it ends with a list of the standard weekly rates offered in each category. Free copies of the booklet may be had from the information division of the Ministry, 10, John Adam Street, London, W.C.2.

FOUNDRY-WORKERS

THE general secretary of the Amalgamated Union of Foundry Workers has issued for his members a booklet [1] which tells them what is being done for their health, safety, and welfare. It is divided into five parts, with a preamble which gives a somewhat unbalanced account of the formation of the two committees which have dealt with conditions in steel and iron foundries respectively.

Part 1 contains in full the recommendations of the Joint Advisory Committee on Conditions in Iron Foundries,[2] but not those of the senior committee on dust in steel foundries which is only mentioned in passing. The new Iron and Steel Foundries Regulations, 1953, are given in full with notes on each regulation. Regulation 7, which deals with the suppression of dust in fumes, is said to be the "most comprehensive in its general effect, dealing as it does with the greatest hazard in the industry." Subsection 6 of regulation 7 says that "all dressing or fettling operations shall be carried out in a separate part of the foundry suitably partitioned off; or in an area of the foundry set apart for the purpose; and shall, so far as reasonably practicable, be carried out with effective and suitable local exhaust ventilation or other equally effective means of suppressing dust, operating as near as possible to the point of origin of the dust." The regulation does not come into operation until Jan. 1, 1956—i.e., twelve years after the setting up of the Dust in Steel Foundries Committee, which was appointed primarily to deal with the problem of dust in the fettling of steel castings. Descriptions and illustrations are given of a new fettling bench to which exhaust ventilation is applied; of an improved exhausted grinding machine; of a swing frame grinder fitted with exhaust ventilation; and also of a new hollow exhausted pneumatic chisel. We hope that these and other improved machines will speedily be installed in all foundries even before 1956, because the medical branch of the Factory Department has been drawing attention, since before the 1939–45 war, to the serious risk of silicosis in steel fettlers. The risk to health was again emphasised in 1950 in the comprehensive report by A. I. G. McLaughlin and his co-workers.[3]

In the preamble to the booklet it is stated that a new joint standing committee on non-ferrous foundries has now been appointed. It is added that there is ample scope for intensive investigation into conditions in this group of foundries and that a review of the Brass Casting Regulations, 1908, is overdue. Part 3 contains in full 15 different codes of regulations which apply in varying degree to foundries, and in particular the Blasting (Castings and other Articles) Regulations, 1949, under which the use of sand as an abrasive is prohibited; and the Foundries (Parting Materials) Special Regulations which prohibit the use of silica parting powders. Both these codes of regulations were issued as a result of the recommendations of the joint standing committees and constitute real advances in preventive medicine.

In Part 4 extracts are quoted from the Factories Act, 1937, which are relevant to foundries. One important section (119) imposes duties on the workers to use (and not misuse) any appliance which is installed in a factory to secure their health or safety. The general secretary exhorts his members to play their part in using properly the facilities and equipment which the employers are legally obliged to supply. "By mutual appreciation of the benefits to be obtained by the improvements introduced, the foundry can be made a much healthier place than ever before."

Part 5 gives in full the National Insurance (Industrial Injuries) (Prescribed Diseases) Amendment Regulations, 1954; a list of the prescribed diseases; and (rather out of context) a description of some practical measures for reducing the amount of fume from oil-bonded cores.

Altogether, this is a useful compendium of information about the legal and practical aspects of foundry work.

TEETHING-POWDERS

IN a memorandum to lay journals the Ministry of Health makes the following observations on "so-called teething-powders":

Babies seldom, if ever, really need powders.

Most powders contain drugs which are harmless in an occasional dose, but which may be harmful if used repeatedly.

No mother should undertake the responsibility of repeated medication of a baby or young child without medical advice.

Babies and young children should never be given a routine "weekly aperient" whether as a "powder" or in any other form.

If a mother thinks her baby needs "powders" it is probable that there is something amiss in the feeding or management. Dosing with "powders" may only lay up trouble for the future, and she should talk things over with her family doctor or the doctor at the clinic, or ask the health visitor to come to see her.

HEALTH STATISTICS

THE first International Conference of National Committees on Vital and Health Statistics, held in London last October,[4] was attended by delegates from twenty-eight countries (members or associate members of the World Health Organisation). The report of the conference, now issued,[5] deals with the health and vital statistics required by the various countries and methods of improving their quality, and with the implementation of international regulations or recommendations of previous W.H.O. committees.

LONDON MEDICAL ORCHESTRA

ABOUT six months ago, a group of doctors, dentists, and nurses formed this orchestra. They gave their first concert in April, and on June 18 some of their members entertained the London Association of the Medical Women's Federation and their friends to an evening's music-making at the Royal Free Hospital School of Medicine. Works by Bach, Purcell, and Mozart were performed with a skill and understanding remarkable for an amateur ensemble. The large audience showed a particular liking for the performance of Bach's Brandenburg Concerto No. 5, in which a young medical student achieved a near-professional standard in playing the difficult part for the solo pianoforte.

1. Health, Safety and Welfare in Foundries. Issued by the Amalgamated Union of Foundry Workers, 164, Chorlton Road, Brooks's Bar, Manchester, 16. Pp. 110. 2*s.* 6*d.*
2. See *Lancet*, 1947, ii, 292.
3. Industrial Lung Diseases of Iron and Steel Foundry Workers. By A. I. G. McLAUGHLIN (with the assistance of others). H.M. Stationery Office, 1950. See *Lancet*, 1950, ii, 576.
4. See *Lancet*, 1953, ii, 867.
5. *World Hlth Org. techn. Rep. Ser.* no. 85. H.M. Stationery Office. Pp. 27. 1*s.* 9*d.*

RADIO IN CARS

THE Mobile Radio Users Association is seeking to ensure that the frequencies allotted to doctors with two-way radio in their cars shall not be interrupted by other users in the band. Those interested are invited to join the association and use its technical and legal services; the minimum annual subscription is one guinea, which includes a monthly newsletter. Further particulars may be had from Mr. Ronald Simms, secretary of the association, Buckingham Court, Buckingham Gate, London, S.W.1.

THE DORSET COASTLINE

THE lovely stretch of coast between Weymouth and Lyme Regis, with its wealth of tradition and local lore, and its old seaports, churches, and monuments, is handsomely celebrated, with the aid of many fine photographs, by a Dorset ex-Naval Surgeon.[1] Yachtsmen will enjoy the sailing yarns, and lovers of the English countryside and of wild birds will find much to delight them.

University of Oxford

Mr. P. R. Allison, thoracic surgeon to the Leeds United Hospital and the Leeds Regional Hospital Board, has been elected Nuffield professor of surgery from Oct. 1. Since the death of Sir Hugh Cairns in 1952 the chair has been vacant.

In 1927 Mr. Allison took his B.SC. at the University of Leeds with first-class honours in physiology, and four years later he graduated M.B., again with first-class honours. After holding resident appointments at the Leeds General Infirmary he took his F.R.C.S. in 1932, and the following year he was appointed surgical tutor and registrar at Leeds University and in 1936 clinical lecturer in surgery. The same year he proceeded to the degree of CH.M. and joined the honorary staff of the infirmary as assistant surgeon. In 1941 his specialist interest in chest surgery was recognised by his appointment as thoracic surgeon to the infirmary and clinical lecturer in thoracic surgery in the university, and he is at present in charge of the thoracic surgical department at the infirmary and regional consultant in his specialty. His numerous publications include papers on the reconstruction of the œsophagus and on the surgical treatment of carcinoma of the lung.

University of Sheffield

The Nuffield Foundation is to establish a research fellowship at the Sheffield centre for the investigation and treatment of rheumatic diseases.

University of Birmingham

Dr. Brian MacMahon has been appointed lecturer in social medicine. The following have been appointed part-time lecturers in obstetrics and gynæcology: Mr. A. L. Deacon, Mr. W. G. Mills, and Miss Dorothy Shotton.

University of Leeds

The council have instituted a new part-time chair of psychiatry and appointed to it Prof. D. R. MacCalman, formerly professor of psychiatry and head of the department of psychiatry.

This change has been made in deference to medical advice given to Professor MacCalman; it will enable him to devote himself to those sections of psychiatry in which he is especially interested, while relieving him of a substantial burden of administrative responsibility. It is expected that in due course a successor to him in the whole-time chair and the headship of the department will be appointed. Meanwhile, Dr. Mary Burbury, senior lecturer in child psychiatry in the university, will act as head of the department.

Royal College of Obstetricians and Gynæcologists

Two public lectures will be given in connection with silver jubilee celebrations which are being held at the college on July 13, 14, 15. On Wednesday, the 14th, Sir William Fletcher Shaw will deliver the William Meredith Fletcher Shaw lecture on The College—its Past, Present, and Future. On Thursday the 15th, Prof. Bruce T. Mayes, of Sydney, who is visiting this country as the Sims-Black professor, will deliver the William Blair-Bell lecture on the Making of an Obstetrician. Both lectures will be given at 11.30 A.M. at 1, Wimpole Street, London, W.1.

International Children's Centre

Some fellowships will be available for those who wish to work at the laboratories of the centre in Paris during 1954–55.

At present the programme of research of the centre is mainly devoted to anti-tuberculosis vaccination and anti-pertussis immunisation. Further particulars may be had from Professor Bugnard, International Children's Centre, Château de Longchamp, Paris 16.

1. The Dorset Coastline. By LLEWELLYN PRIDHAM, M.B.C.S. R.N. retd. Photography by Edward Kestin. Dorchester: Longmans (Dorchester) Ltd. 1954. Pp. 126. 25s.

Ophthalmological Society of the United Kingdom

Dr. Robert Leishman (Glasgow) has been awarded the 1954 Treacher Collins prize for his essay on the Eye in General Vascular Disease: Hypertension and Arteriosclerosis.

Royal Medico-Psychological Association

The following have been successful in the association's examinations for the diploma in psychological medicine:

J. K. Arkle, U. B. H. Baruch, N. C. Connell, T. B. Stephens, R. M. Taylor.

British Diabetic Association

The annual scientific meeting of this association is to be held at University College Hospital Medical School, London, W.C.1, on July 16 and 17. On Friday, the 16th, at 2.30 P.M., Dr. K. Hallas-Møller (Copenhagen) will deliver the Banting lecture, on the Chemical and Physiological Background of the new Insulin Zinc Suspensions. The programme will also include discussions on the insulin zinc suspensions (opener, Dr. W. G. Oakley), and plasma-insulin estimations (Dr. P. J. Randle and Dr. J. Vallance-Owen). Further particulars can be had from the secretary of the association, 152, Harley Street, London, W.1.

Service Conference

A joint Services medical-surgical diagnostic and therapeutic conference is to be held at the U.S. Embassy, 5, Grosvenor Square, London, W.1, on July 22, 23, and 24. Speakers will include officers from the U.S. Air Force, the Royal Air Force, the Royal Army Medical Corps, the Royal Naval Medical Service, and the United States Navy, and British civilian physicians and surgeons. The conference is open to Service and civilian doctors. Further information may be had from Colonel L. Render Braswell, Headquarters Third Air Force, Office of the Surgeon, Victoria Park Estates, South Ruislip, Middlesex.

Medical Honours

Captain D. R. Boyns, R.A.M.C., has been appointed M.B.E. in recognition of distinguished services in Malaya.

In announcing the award *The Times* (June 19) relates that Captain Boyns fractured his back in a parachute descent in the Malayan jungle. But from the moment he landed he immediately started to help others who had been injured, moving from place to place over rough country. No-one knew that he had himself been hurt until after the operation was over.

Captain Alasdair Fraser-Darling, R.A.M.C., has been appointed M.B.E. in recognition of brave conduct in Libya on Jan. 15–16.

CORRIGENDUM: *The Disabled.*—The M.R.C. memorandum by Prof. T. Ferguson mentioned in our leading article (June 5) is no. 28.

Diary of the Week

JUNE 27 TO JULY 3

Tuesday, 29th

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. H. J. Wallace: Endocrine Disorders Affecting the Skin.

Wednesday, 30th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Prof. T. F. Hewer: Gastritis.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. O. Oliver: Mycobacteria in Skin Disease.

Thursday, 1st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5.30 P.M. Mr. J. E. Piercy: Diseases of Thyroid, Parathyroid, and Thymus Glands.
POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. J. F. Goodwin: Peripheral Vascular Disease.
4.30 P.M. Dr. R. I. S. Bayliss: Adrenal Function in Health and Disease.

Friday, 2nd

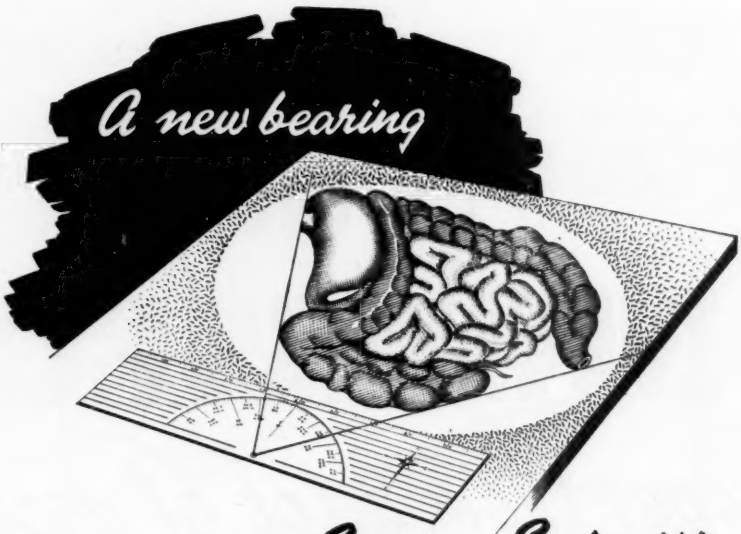
POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Prof. C. G. Rob: Blood-vessel Grafting.
INSTITUTE OF CHILD HEALTH, The Hospital for Sick Children, Great Ormond Street, W.C.1
5 P.M. Dr. T. Ehrenphreis (Stockholm): Hirschsprung's Disease.

Births, Marriages, and Deaths

BIRTHS

PRITCHARD.—On June 19, to Dr. Meira and Dr. T. Gwilym Pritchard, Pen-y-Groes, Caernarvon—a son.

A H



on Gastro-Enteritis

Emphasis has been given recently to the use of combined chemotherapy in infections and the merit of the judicious combination of antibiotics and sulphonamides in the prevention of bacterial resistance.

In the treatment of many infections of the gastro-intestinal tract, combined therapy with streptomycin and sulphaguanidine is a distinct advance on previous forms of treatment.

Guanimycin, in which oral streptomycin sulphate is combined with sulphaguanidine, is indicated in the treatment of gastro-enteritis, bacillary dysentery, summer diarrhœa, salmonella food poisoning and other mixed infections of the gastro-intestinal tract in infants, children and adults.

Guanimycin is issued as a free-flowing powder from which a smooth, palatable, homogeneous suspension may be made by simple mixture with water.

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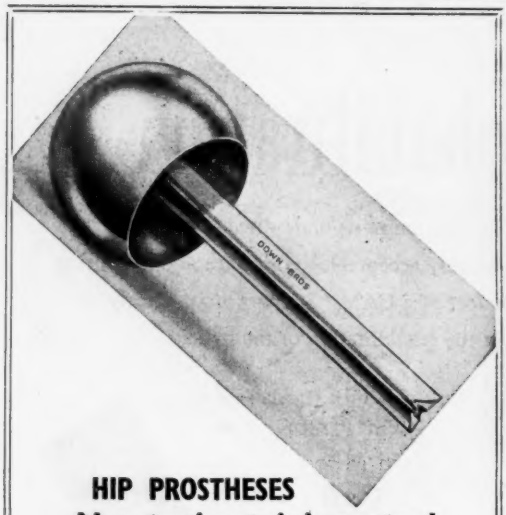

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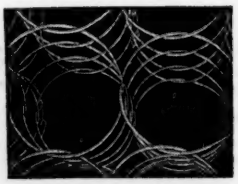

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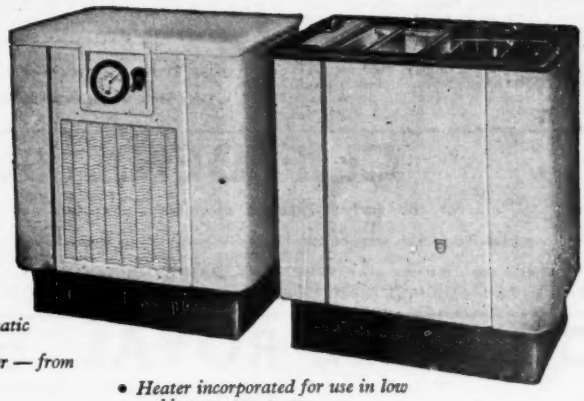

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Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

Dr. ERNEST BASIL VERNEY, F.R.C.P., F.R.S., will deliver the BERTRAM LOUIS ABRAHAMS LECTURE on THURSDAY, 8TH JULY, 1954, at 5 P.M. at the College, Pall Mall East, S.W.1.

Subject: "Some Aspects of the Renal Excretion of Water and Salt."

Any member of the Medical Profession admitted on presentation of card.

By order of the President.
HAROLD BOLDERO, Registrar.

UNIVERSITY OF LONDON

A LECTURE entitled "Some Observations of Electrical Activity in Normal and Pathological Muscles" will be given by Prof. A. R. MCINTYRE (Nebraska) at 5.30 P.M. on 6TH JULY at Guy's Hospital Medical School, St. Thomas's-street, London Bridge, S.E.1.

Admission free, without ticket.
JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF DURHAM
KING'S COLLEGE, NEWCASTLE UPON TYNE

COURSES OF INSTRUCTION FOR THE POSTGRADUATE DIPLOMA IN PSYCHOLOGICAL MEDICINE

Part I—A part-time course will be given on 1½ days a week throughout the year, commencing in OCTOBER. Fee £20.

Part II—A full-time 6 months course in Psychiatry and Neurology commences in OCTOBER. Fee £40.

The above courses are integrated with the Newcastle and Sheffield Regional Hospital Board Training Scheme for Psychiatrists. Arrangements can be made for candidates from overseas to complete the requisite clinical experience during the 6 months course.

Separate courses, including clinical experience, are available in Neurology (2 terms; fee £15) and Child Psychiatry (2 months; fee £25).

Further particulars, regulations and syllabus for the Diploma and application forms, may be obtained from the Assistant Registrar, The Medical School, King's College, Queen Victoria-road, Newcastle upon Tyne, 1.

G. R. HANSON, Registrar of King's College.

UNIVERSITY OF EDINBURGH

CHAIR OF PSYCHIATRY

The University of Edinburgh will shortly proceed to make an appointment to the Chair of Psychiatry which will become vacant on 1ST OCTOBER, 1954.

The terms and conditions of appointment may be obtained from the undersigned, with whom applications (8 copies), giving the names of 2 referees and including any testimonials or evidence candidates may wish to offer, should be lodged not later than 15th July, 1954.

Overseas candidates may submit 1 copy of their application which should be received not later than 15th August, 1954.

CHARLES H. STEWART, Secretary to the University.

THE UNIVERSITY OF LEEDS

DIPLOMA IN PSYCHOLOGICAL MEDICINE

A course for the Diploma in Psychological Medicine will commence in OCTOBER, 1954, if sufficient entries are received. Instruction will be part-time and will occupy 3 half-days a week during 8 academic terms (2½ years).

Further particulars may be obtained from the Sub-Dean, School of Medicine, Leeds, 2, to whom application for admission to the Course should be sent as soon as possible.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 5TH JULY, 1954. The following Examination will be held in December, 1954.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

CANCER RESEARCH
M.O. GORDON WILL TRUST

Clause 11 of the Will of the late Mrs. M. O. Gordon directs her Trustees to apply her residuary Trust Fund for Cancer Research to be made by investigators of either sex selected by her Trustees, such investigators to be graduates in medicine over 21 and British subjects born in Great Britain.

Applications by any persons interested should be addressed to the undersigned before 24th July, 1954, giving qualifications, proposed research, amount of grant required, the period of time for which the grant is to be effective, and references.

GODWIN, BREMRIDGE & Co., Trustees' Solicitors.
8, St. Thomas-street, Winchester.

THE WELSH NATIONAL SCHOOL OF MEDICINE. (UNIVERSITY OF WALES.) SENIOR LECTURER in the Department of Obstetrics and Gynæcology. Applications are invited for the post of Senior Lecturer in the Department of Obstetrics and Gynæcology of The Welsh National School of Medicine. The person appointed will be required to assist in the work of the Professorial Department as directed by the Professor, and in the care of patients at the Cardiff Royal Infirmary and other hospitals. The post is full-time with salary on the scale £1500–£100–£2000 p.a. Schemes of superannuation and family allowances apply to the appointment.

Further particulars may be obtained from the undersigned, by whom applications should be received within 3 weeks of the appearance of this advertisement.

34, Newport-road, Cardiff. F. DODSWORTH, Secretary.

THE WELSH NATIONAL SCHOOL OF MEDICINE. (UNIVERSITY OF WALES.) SENIOR LECTURER for Medico-legal Services and for Teaching in Forensic Medicine. Applications are invited for the post of Senior Lecturer in Forensic Medicine. The appointment is full-time and the salary will be on the scale £1500–£100–£2000 p.a., with participation in the superannuation and family allowance schemes. There are facilities for research.

Further particulars may be obtained from the undersigned, by whom applications should be received within 3 weeks of the appearance of this advertisement.

34, Newport-road, Cardiff. F. DODSWORTH, Secretary.

THE WELSH NATIONAL SCHOOL OF MEDICINE. (UNIVERSITY OF WALES.) Senior Lecturer (Clinical Bacteriologist). Applications are invited for the post of CLINICAL BACTERIOLOGIST (grade—Senior Lecturer). The duties will include hospital bacteriology and teaching. The appointment is full-time and the salary will be on the scale £1500–£100–£2000 p.a., with participation in the superannuation and family allowance schemes. There are facilities for research.

Further particulars may be obtained from the undersigned, by whom applications should be received within 3 weeks of the appearance of this advertisement.

34, Newport-road, Cardiff. F. DODSWORTH, Secretary.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. BERNHARD BARON MEMORIAL RESEARCH LABORATORIES. A REGISTRAR will be required in September at the above Laboratories. Previous specialised experience is not essential. The successful candidate will receive training in serology and bacteriology, and may later assist in the research work. The post is resident, but it may be possible to live out by arrangement.

Applications to the Secretary to the Board of Governors by 5th July on forms obtainable from 339, Goldhawk-road, London, W.6.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL. BACTERIOLOGY DEPARTMENT. ASSISTANT required, medically qualified, preferably with experience of bacteriology. Duties consist of teaching and research. Salary scale £700–£900 p.a., with superannuation benefits and children's allowance.

Applications should be made immediately to the Secretary of University College Hospital Medical School, University-street, London, W.C.1.

UNIVERSITY OF LONDON KING'S COLLEGE will require on 1st October, 1954, a LECTURER IN PHYSIOLOGY. The appointment will be on the Junior Lecturer scale of £600–£50–£750, with family allowances and F.S.S.U. benefits.

Particulars and application forms should be obtained from the Registrar, King's College, Strand, W.C.2, whom completed applications should reach by 10th July.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LECTURER in the Department of Bacteriology. Preference will be given to medically qualified candidates. The salary will be within the range £900–£1200 p.a. according to age, qualifications and experience of the successful candidate.

Applications, stating age, qualifications and experience, together with the names of 3 referees, should be received not later than 3rd July, 1954, by the undersigned, from whom further particulars may be obtained.

STANLEY DUMBELL, Registrar.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a Part-time RESEARCH ASSISTANT IN CHILD HEALTH to assist in an investigation in the prevention of tuberculosis in children, to begin duties on 1st October, 1954. The appointment will be for 1 year in the first instance and the duties of the post will occupy 4 half-days a week. Salary 12 guineas a week.

Further particulars should be obtained from the Registrar with whom applications (3 copies) should be lodged by 10th July, 1954.

UNIVERSITY OF ABERDEEN. Applications invited for LECTURESHIP IN PATHOLOGY. Salary £600–£100–£900 or £1000–£100–£1300 (initial placing according to qualifications and experience), with F.S.S.U. and children's allowance. Part of furniture removal expenses to Aberdeen refunded.

Conditions of appointment and forms of application should be obtained from the undersigned, with whom applications (8 copies) should be lodged by 17th July, 1954. Candidates outside the British Isles need submit 1 copy only of their letter of application.

The University, Aberdeen. W. S. ANGUS, Secretary.

UNIVERSITY OF MALAYA, Singapore. Applications are invited for 2 ASSISTANT LECTURESHIPS IN ANATOMY. Salary £735 p.a. Allowances: expatriation £210 p.a., cost-of-living in range £294–£477 p.a., for medical qualification (temporary) £210 p.a. All paid in Malayan currency. Free passages for appointee, wife, and children under 12 years. Part-furnished quarters at low rent or housing allowance in lieu. Provident fund scheme.

Applications (6 copies), naming 3 referees and stating full qualifications and experience, to be received by 31st July, 1954, by Secretary, Inter-University Council for Higher Education in the Colonies, 1, Gordon-square, W.C.1, from whom further information may be obtained.

UNIVERSITY OF OTAGO, Dunedin, New Zealand. The University of Otago proposes to appoint a PROFESSOR OF MICROBIOLOGY, to take up office as soon as convenient. Salary £2002 8s.–£2502 8s. p.a.

Further particulars are available from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. Applications close in London and New Zealand on 31st July, 1954.

Hospital Services : Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT OPHTHALMOLOGIST (2 half-days a week ; at present Monday and Thursday A.M.), King Edward VII Hospital, Windsor (517 Beds).

Applications by 23rd July, 1954.

(2) CONSULTANT OPHTHALMIC SURGEON (5 hours a week), Royal Northern Hospital, Holloway, N.7 (279 Beds).

Applications by 23rd July, 1954.

(3) CONSULTANT ANÆSTHETIST (2 half-days a week), Hendon District Hospital, N.W.4 (63 Beds).

Applications by 26th July, 1954.

(4) ASSISTANT ANÆSTHETIST at West Herts Hospital, Hemel Hempstead, Herts (167 Beds). Salary £1500 (at age 32) —£1950.

Applications by 12th August, 1954.

(5) MEDICAL DIRECTOR, Mass X-ray Unit 5B, Paddington General Hospital, 285, Harrow-road, W.9, to take charge initially of one unit working in the London area and possibly second unit later. Duties include sessional work at Willesden Chest Clinic. Experience in chest diseases essential. Salary £1500 (at age 32)—£1950. Unit and Clinic may be visited by direct appointment.

Applications by 29th July, 1954.

(6) CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (6 half-days a week), Windsor Group of hospitals ; mainly King Edward VII Hospital (517 Beds) and Maidenhead Hospital (100 Beds). Successful candidate required to live in area.

Applications by 3rd August, 1954.

(7) CONSULTANT PATHOLOGIST (whole-time or maximum sessions), West Middlesex Hospital, Isleworth, Middlesex (1143 Beds). Good experience in bacteriology and haematology essential.

Applications by 6th August, 1954.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of ASSISTANT PHYSICIAN (Consultant, part-time) to work at The Royal Free and Hampstead General Hospitals. Duties to commence on 1st November, 1954.

Applications, stating age and experience, together with the names of 3 referees, should be forwarded to the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 13th August, 1954.

BROMSGROVE. BARNSLEY HALL HOSPITAL. (750 Beds.) Whole-time ASSISTANT PSYCHIATRIST. Salary £1500–£1950 p.a. Wide experience specialty essential and special knowledge or interest in psychotherapy an advantage.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 12th July, 1954.

GATESHEAD-ON-TYNE. DUNSTON HILL HOSPITAL. CONSULTANT ANÆSTHETIST required for 1 half-day a week (Tuesday morning). National Health Service terms and conditions of service.

Detailed applications (9 copies), giving nationality, date of birth, qualifications and experience including present appointments and the names of 3 referees, should reach Ministry of Health, Hospital Management Branch, Norcross, Blackpool, Lancashire, by 16th July, 1954.

LEEDS REGIONAL HOSPITAL BOARD. Locum Tenens CONSULTANT in Anæsthetics required for the Thoracic Unit, Castle Hill Hospital, near Hull, for a period of approximately 6 months.

Applications, stating age, qualifications and details of previous appointments, together with the names and addresses of 3 referees, should be forwarded to the Secretary to the Board, Park-parade, Harrogate.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time non-resident post of ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer) to the Group Pathology Laboratory in the Bury and Rossendale Hospitals at Bury General Hospital. Successful candidate will work under general guidance of a Consultant and facilities for gaining experience in all branches of pathology are available.

Application forms from the Senior Administrative Medical Officer to the Board at Cheetwood-road, Manchester, 8, to be returned by 30th June, 1954.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. Whole-time ASSISTANT RADIOLOGIST, to commence as soon as possible. Duties will be divided between Manchester Royal Infirmary and St. Mary's Hospitals for Women and Children, Manchester, under the direction of the Consultant Radiologists. Candidates must possess the D.M.R.D. and must have had wide experience in radiology. Senior Hospital Medical Officer grade.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 14th July, 1954.

F. J. CABLE, Secretary to the Board of Governors.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. ROYAL VICTORIA INFIRMARY. Applications are invited for the appointment of Whole-time or maximum Part-time RADIOTHERAPIST (Consultant), who will be recognised as Deputy to the Head of the Radiotherapy Department.

Applications, giving age, nationality, experience and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the date of appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of ASSISTANT DIAGNOSTIC RADIOLOGIST on the staff of the Aberdeen General Hospitals. Candidates should have experience in their specialty and hold a Diploma in Radiology. The salary is on the scale £1500–£1950 and the terms and conditions of service for hospital medical and dental officers under the National Health Act (Scotland) will apply to the post.

Applications, together with the names and addresses of 2 referees, should be forwarded by 17th July, 1954, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time post of SENIOR HOSPITAL MEDICAL OFFICER in Anæsthetics at the Stornoway Hospitals. Duties are mainly at the Lewis Hospital, where a rented house is available for the officer.

Schedules of application and further particulars are obtainable from the undersigned, with whom applications should be lodged by 17th July, 1954.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments :—

CONSULTANT SURGEON in charge of wards at the Western Infirmary, Glasgow. The appointment is part-time remunerated on the basis of 7 notional half-days per week.

CONSULTANT E.N.T. SURGEON at Glasgow Royal Infirmary and with other duties elsewhere in the Region as may be arranged. The appointment is part-time remunerated on the basis of 8 notional half-days per week.

Whole-time ASSISTANT E.N.T. SURGEON based at Glasgow Royal Infirmary with duties at the County Hospital, Stonehouse, and elsewhere in the Lanark County Area. Salary on the scale £1500–£50–£1950.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST for the Middlewood Hospital, Sheffield. Salary scale £1500–£50–£1950. A house is available.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 17th July, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. 2 CONSULTANT OPHTHALMOLOGISTS, each for 6 notional half-days per week. Main duties at the Leicester Royal Infirmary. Other duties will include attendance at the Leicester County Borough School Clinic.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 24th July, 1954.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Whole-time SENIOR CASUALTY OFFICER to have clinical charge of Casualty Department. Salary £1500–£1950 p.a. Tenable up to 4 years. Higher qualification an advantage.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 12th July, 1954.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer grade) for the Portsmouth and Isle of Wight Area Pathological Service. A condition of the appointment is residence in the Gosport and Lee on Solent area.

Applications (5 copies), giving date of birth, qualifications, experience and names of 3 referees, to the Area Secretary, South West Metropolitan Regional Hospital Board, Highcroft, Romsey-road, Winchester, by 12th July, 1954. Applicants may visit the Central Laboratory, Milton-road, Portsmouth, by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time NON-RESIDENT ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for the Royal Earlswood Group of (M.D.) Hospitals (1000 Beds approximately). Candidates should possess D.P.M. and preferably have some experience of child psychiatry. Successful candidate required to live within reasonable distance of Royal Earlswood Institution, Redhill, Surrey.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, London, W.1, by 17th July, 1954. Applicants may visit hospitals by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a Locum PHYSICIAN (9 half-days per week) immediately for at least 3 months in the Bournemouth and East Dorset Group of hospitals. Remuneration at the rate of 45 guineas per week (if holding National Health Service Consultant grading) otherwise 31½ guineas per week.

Applications immediately to the Area Secretary, South West Metropolitan Regional Hospital Board, Highcroft, Romsey-road, Winchester.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of ASSISTANT SENIOR MEDICAL OFFICER (whole-time) on the headquarters staff of the Board's office. The salary is £1500–£75(4)–£100–£1900, subject to review by the Medical (Whitley) Council for the Health Services. The successful candidate will be engaged on general administrative duties under the Board's Senior Administrative Medical Officer. Experience of public health and hospital administration would be an advantage. The appointment is subject to the provisions of the National Health Service superannuation regulations, and to the conditions of service approved by the Minister of Health.

Applications, stating age, qualifications and experience, and giving the names and addresses of 3 referees, should reach the Secretary of the Board at 27, Tyndalls Park-road, Bristol, 8, not later than 14th July, 1954.

WOLVERHAMPTON. ROYAL HOSPITAL. Whole-time SENIOR CASUALTY OFFICER to have clinical charge of Casualty Department. Salary £1500–£1950 p.a. Tenable up to 4 years. Higher qualification an advantage.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 12th July, 1954.

IRELAND. ST. JOHN OF GOD PRIVATE PSYCHIATRIC HOSPITAL, STILLORGAN, CO. DUBLIN, IRELAND. (Conducted by Brothers of St. John of God. Hospital contains 135 Beds.) Applications are invited for the position of RESIDENT MEDICAL DIRECTOR at above Hospital. Candidates should be of Consultant status and possess the highest qualifications.

Application forms with particulars sent on request. Completed forms to be returned not later than 31st August, 1954, to Brother Secretary, St. John of God Private Psychiatric Hospital, Stillorgan, co. Dublin, Ireland.

IRELAND. ST. JOHN OF GOD PRIVATE PSYCHIATRIC HOSPITAL, STILLORGAN, CO. DUBLIN, IRELAND. Applications invited immediately for position of LOCUM TENENS to the above Hospital, period of employment—3 months; renewal is not guaranteed. Qualifications—D.P.M. essential.

All inquiries directed to Brother Secretary, St. John of God Private Psychiatric Hospital, Stillorgan, co. Dublin, Ireland.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD. DUNEDIN HOSPITAL AND UNIVERSITY OF OTAGO, NEW ZEALAND. Applications are invited for the position of JUNIOR PSYCHIATRIC SPECIALIST AND LECTURER IN PSYCHIATRY from those who hold a Degree in Medicine of an approved University and possess a Diploma of Psychological Medicine. The position is designated as that of Junior Specialist under the Hospital Employment (Medical Officers) Regulations, 1952, Amendment No. 1. Salary scale £NZ1290–£NZ1590 (plus cost-of-living bonus £NZ62 12s. p.a.) by annual increments of £NZ50. Commencing rate of salary according to qualifications and experience. Duties will include the teaching of psychiatry to medical undergraduates. Clinical work is carried out in the Department of Psychiatry, Dunedin Hospital, the general teaching hospital of the Medical School. The Department has 10 Beds in the general medical wards, and a 14-bedded observation and treatment ward. There are adult and child outpatient clinics. The position is a non-resident one.

Applications for this position should be made on the prescribed form obtainable from the Office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2, or from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, who can supply further information and conditions of appointment. Applications should be in the hands of the undersigned not later than 10 A.M. on Tuesday, 31st August, 1954.

T. H. MILES, Acting Secretary.

Otago Hospital Board, P.O. Box 946, Dunedin, New Zealand.

SOUTH AFRICAN BLOOD TRANSFUSION SERVICE. Applications are invited from registered medical practitioners with experience in blood-transfusion and bacteriology for the position of SEROLOGIST of the South African Blood Transfusion Service. The appointment will be made on the salary scale £1700–£100–£2400 p.a. but, in determining the commencing salary cognisance may be taken of previous experience and special qualification. The successful applicant will be expected to assume duty in Johannesburg on 1st November, 1954. Membership of the Service's Staff Provident Fund is a condition of employment.

Applications, stating full details of age, qualifications, experience, marital status, &c., should be submitted in writing to the Secretary, South African Blood Transfusion Service, P.O. Box 9326, Johannesburg, so as to be received not later than 15th August, 1954. The Medical Director of the Service will be in London early in September, 1954, to interview applicants at a time and place to be advised.

Hospital Services : Junior Appointments

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEON (resident), vacant 19th July. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 12th July.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in Obstetrics and Gynæcological Department. Post recognised for M.R.C.O.G. Appointment for 6 months from 1st August.

Applications, with copies of 2 testimonials, to Medical Director by 3rd July, 1954.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in Orthopædic Department. Pre-registration applicants will be considered. Appointment for 6 months from 16th August.

Applications, with copies of 2 testimonials, to Medical Director by 3rd July, 1954.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, London, N.W.10. RESIDENT SENIOR HOUSE OFFICER required for Casualty Department. Successful candidate will work under supervision of Orthopædic and Traumatic Specialist. Preference given to applicant who has held resident surgical and medical posts in general hospital. Post now vacant. Appointment for 6 months subject to renewal for further 6 months.

Applications, with names of 2 referees or copies of 2 testimonials, to Medical Director by 3rd July.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered Women medical practitioners for the appointment of Full-time MEDICAL REGISTRAR for General Medicine and Pædiatrics. Appointment for 1 year in the first instance, to commence 1st September, 1954. Salary in accordance with Ministry of Health scale for Registrar grades.

Applications, with names of 3 referees, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 10th July, 1954.

GROUP PATHOLOGICAL LABORATORY, ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. FULHAM AND KENSINGTON AND CHELSEA HOSPITAL MANAGEMENT COMMITTEES. Applications are invited for appointment as REGISTRAR (pathology), vacant 1st September, 1954. Candidates will be required to work at the Group Laboratory and as required at any other hospital in either of the 2 Groups. Candidates may visit the Laboratory by arrangement with the Director of Pathology.

Applications (5 copies to be completed) to be submitted by 2nd July, 1954, on forms obtainable from the Group Secretary (L.10), Fulham and Kensington Hospital Management Committee, 5, Collingham-gardens, London, S.W.5.

HACKNEY HOSPITAL, London, E.9. (General—844 Beds.) Applications from registered medical practitioners for the posts of HOUSE OFFICERS (casualty) (1 with additional duties in the Skin Department and 1 with additional duties in the E.N.T. Department), should be sent as soon as possible to the Group Secretary at the above address.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (general medicine) required.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 5th July.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. HOUSE SURGEON (orthopædics) required 16th August.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 3rd July.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE PHYSICIAN, vacant 4th July, 1954. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials, to Hospital Secretary.

HOSPITALS FOR DISEASES OF THE CHEST. London CHEST HOSPITAL. A vacancy occurs on 1st August, 1954, for RESIDENT HOUSE SURGEON. The appointment is for 6 months at the Hospital's Country Branch, near Hitchin and Letchworth, Herts. The post is graded as Senior House Officer and provides excellent opportunities for experience in thoracic surgery.

Applications from registered medical practitioners, stating age, qualifications with dates and previous appointments held, with copies of 3 testimonials, should be sent at once to—

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of Locum REGISTRAR to the Diagnostic X-ray Department until 30th September when a permanent post becomes vacant. Candidates with or without the Diploma of Radiology will be considered.

If applicants wish to apply for the latter, applications should be received by 30th June. Otherwise applications stating age, qualifications and experience, together with the names of 2 referees, should be addressed to the undersigned by 6th July, 1954. S. W. BARNES, House Governor.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE SURGEON. The appointment is for 6 months from 23rd July, 1954, and is recognised for the F.R.C.S.

Application forms may be obtained from the Physician-Superintendent at the Hospital.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE PHYSICIAN, vacant 1st August, 1954.

Forms of application from the Physician-Superintendent.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR HOUSE OFFICER to Surgical Outpatient Department.

Applications (6 copies), giving full particulars, together with 6 copies of 3 recent testimonials, to reach the House Governor by 12th July, 1954. H. BRIERLEY, House Governor.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. (General—56 Beds.) Applications are invited from registered medical practitioners for the posts of HOUSE SURGEON (recognised for F.R.C.S.) and HOUSE PHYSICIAN; both posts recognised for pre-registration. Vacant 5th July. Candidates should be in sympathy with the Evangelical aims of the Hospital.

Apply to the Medical Superintendent, with references, as soon as possible.

MEMORIAL HOSPITAL, Woolwich, S.E.18. Woolwich GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. 2 vacancies 1st August. Recognised for F.R.C.S. and approved for Pre-registration Service.

Apply, with copies of testimonials, to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MOTHERS' HOSPITAL (Salvation Army), Clapton, E.5. (Maternity—110 Beds. Recognised for M.R.C.O.G.) Applications are invited for the 12 months appointment of SENIOR HOUSE OFFICER (obstetrics) and should be sent in full detail with copy testimonials to the Group Secretary, Hospital Management Committee, Hackney Hospital, London, E.9, quoting reference MH/SHO.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (non-resident) at The National Hospital, Queen-square, W.C.1. This post carries the grade of Senior Registrar. Previous neurological experience and higher medical qualification are desirable. The appointment will be for 1 year in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 3rd July, 1954.

H. EWART MITCHELL, Secretary.

The National Hospital, Queen-square, W.C.1.

NEASDEN HOSPITAL, Brentfield-road, N.W.10. (Tel. No. WILlesden 1850.) Locum Tenens RESIDENT MEDICAL OFFICER (Registrar). Whole-time P-sident Registrar required for above Hospital for 19th July, 1954–1st August, 1954, both dates inclusive. This Hospital admits all types of acute infectious diseases and offers a wide clinical experience and opportunity for postgraduate studies.

Applications should be made to the Physician-Superintendent as soon as possible.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. CASUALTY OFFICER (Senior House Officer grade). Post recognised for F.R.C.S. 6 months appointment in the first instance, from 16th August (Locum required 15th July to 15th August). Non-resident.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital by 5th July.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

MEDICAL REGISTRAR (resident or non-resident), German Hospital, E.8. Appointment subject to review after 1 year.

Applications in triplicate detailing date of birth, qualifications, experience, present appointment, grade and salary, with 3 copies of 2 recent testimonials, to Secretary, 11A, Portland-place, W.1, by 10th July, 1954.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. SENIOR REGISTRAR in Psychiatry, Department for Children and Parents, Tavistock Clinic, 2–4, Beaumont-street, W.1. Post vacant 1st September, 1954. At least 1 years previous experience in child psychiatry essential. Clinic may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 7th July, 1954.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. REGISTRAR in Psychiatry, Department for Children and Parents, Tavistock Clinic, 2–4, Beaumont-street, W.1. Post vacant 1st October, 1954. At least 1 years previous experience in child psychiatry essential. Clinic may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 7th July, 1954.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. SENIOR REGISTRAR at Willesden Chest Clinic, Pound-lane, N.W.10, and Clare Hall Hospital, South Mimms, Barnet. The first 2 years will be spent at Chest Clinic, and duties will include work on the district, supervision of beds in Tuberculosis Unit at Central Middlesex Hospital, and teaching, followed by opportunity of further 2 years (approximately) at Clare Hall Hospital. Good training in general medicine and chest diseases essential. Higher medical qualifications desirable. Appointment subject to annual review. Clinic may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 17th July, 1954.

REGIONAL NEUROSURGICAL CENTRE. (50 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (neurosurgery), vacant 1st August. The post, which is recognised for F.R.C.S., also provides excellent opportunity for training in neurology. Salary £745 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ROYAL CANCER HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for the post of MEDICAL REGISTRAR. The post, which is for 7 sessions a week, may be filled either in the grade of Registrar or alternatively in the grade of Senior Registrar by a candidate wishing to take a period of advanced training for not more than 2 years, or by a candidate holding a Consultant or Senior Hospital Medical Officer post elsewhere. For appointment as Senior Registrar candidates holding the Diploma of M.R.C.P. will be preferred. If the appointment is in the grade of Registrar some increase in the number of sessions may be considered. The duties include clinical studies of the health of staff, in support of the Hospital's Radiological Protection Service.

Applications, stating whether a Senior Registrar or Registrar post is desired, together with copies of 3 recent testimonials, should be submitted by 7th July on a form which may be obtained from the House Governor.

ROYAL CANCER HOSPITAL, Fulham-road, London, S.W.3. Applications are invited from registered medical practitioners for the 2 posts of HOUSE SURGEON (resident). Salary £525 p.a. The posts are tenable for 6 months from 1st September, 1954.

Forms of application are obtainable from the House Governor to whom applications, together with copies of 3 recent testimonials, should be sent not later than Wednesday, 14th July, 1954.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, CASUALTY HOUSE SURGEON. Duties include inpatient, outpatient and casualty work. Post recognised for F.R.C.S. Vacant now.

Applications, stating age, nationality and qualifications, to the Secretary.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR HOUSE SURGEON for Casualty, for a period of 6 months, to commence immediately.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. JUNIOR OBSTETRIC OFFICER (Senior House Officer), resident post tenable for 6 months from 1st October, 1954.

Applications to the Secretary to the Board of Governors by 10th July on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. JUNIOR CASUALTY OFFICER (Male or Female) required (House Officer—third post) for 6 months commencing as soon as possible.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 8th July, 1954.

S.E. REGIONAL THORACIC SURGERY UNIT. (46 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (recognised for F.R.C.S.), vacant now. The Unit treats all types of chest diseases and offers opportunity for comprehensive training in thoracic surgery. Appointment for 6 months in first instance and may be renewed for further period.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. JAMES' HOSPITAL, Sarsfeld-road, S.W.12. Wands-WORTH HOSPITAL GROUP. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Post of REGISTRAR vacant in E.N.T. Department.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary, 14, Atkins-road, Balham, S.W.12, to be completed and returned by 3rd July.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (General—182 Beds.) Applications are invited from registered or provisionally registered medical practitioners for the posts of :—

HOUSE SURGEON available 16th July, 1954.

HOUSE PHYSICIAN available 5th July, 1954.

Applications, with 2 recent testimonials, to Hospital Secretary by 3rd July, 1954.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOS-PITALS AND THE INSTITUTE OF UROLOGY. A vacancy will occur on 1st September, 1954, for the combined post of RESIDENT SURGICAL OFFICER at St. Philip's and FOLLOW-UP OFFICER to the Institute. Grading, Registrar first year. Appointment for 6 months with opportunity for extension.

Apply, in writing (6 copies), and names of 2 referees, to the House-Governor, St. Peter's Hospital, Henrietta-street, W.C.2. Closing date 24th July, 1954.

ST. THOMAS'S HOSPITAL, London, S.E.1. Research REGISTRAR to the Department of Psychological Medicine. 1 year in the first instance. Successful candidate to devote whole time to clinical research in psychiatric treatment.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 5th July, 1954.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. HOUSE OFFICER (anæsthetics) required 1st September.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary by 10th July.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the following posts at above Hospital.

ORTHOPÆDIC HOUSE SURGEON. This post, which is recognised for the F.R.C.S. examination, is at present vacant.

ORTHOPÆDIC HOUSE SURGEON (pre-registration post), vacant on 18th July, 1954, but available on a locum basis 2 weeks prior to this date.

Application forms from the Hospital Secretary to be returned within 12 days of the appearance of this advertisement.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. WOODEND GENERAL HOSPITAL. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Thoracic Surgery Department of the above Hospital. The post, which is non-resident, is subject to the conditions of service issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, and the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

AYLESBURY, BUCKINGHAMSHIRE. ROYAL BUCK-INGHAMSHIRE HOSPITAL. Locum CASUALTY OFFICER for 1 week from 18th July. Salary £13 per week.

Applications, with names of 2 referees, to the Secretary-Superintendent.

AYLESBURY. ROYAL BUCKINGHAMSHIRE AND ASSOCIATED HOSPITALS MANAGEMENT COMMITTEE.
Stoke Mandeville Hospital, Aylesbury

JUNIOR HOSPITAL MEDICAL OFFICER for National Spinal Injuries Centre. Neurological or surgical experience desirable. Vacant 1st July.

Applications, with copies of 2 recent testimonials, to the Administrative Officer.

HOUSE PHYSICIAN (Senior Resident Medical Officer) for Acute General Medical Unit, which comprises 2 Registrars and 3 Resident House Physicians. The post is of Senior House Officer grade and is vacant on 7th July.

Applications, with 3 recent testimonials, to Administrative Officer.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds with all the usual special departments.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT ANÆSTHETIC REGISTRAR (Male) required at above Hospital for general anæsthetic duties at Ashford and such other hospitals within the Group as may be necessary. Post vacant 7th September. Hospital may be visited by direct appointment with the Medical Director.

Application forms obtainable from, and returnable to, the Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 7th July, 1954.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. HOUSE PHYSICIAN required at Ashton-under-Lyne General Hospital. Preference will be given to pre-registration applicants. Post vacant mid-July.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Astley-road, Stalybridge, Cheshire, as soon as possible.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. 2 HOUSE SURGEONS required at Ashton-under-Lyne General Hospital. Preference will be given to pre-registration applicants. Recognised for F.R.C.S. (Eng.).

Applications, stating age, nationality, qualifications, and experience, if any, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Astley-road, Stalybridge, Cheshire, as soon as possible.

ABERYSTWYTH. GENERAL HOSPITAL. (Hospital recognised for F.R.C.S. examination.) MID-WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from newly qualified medical practitioners seeking pre-registration posts under the Medical Act, 1950, for the resident post of HOUSE SURGEON at the above Hospital. Busy General Hospital. Salary on national scale, less deduction for board and lodging.

Applications, with 2 testimonials, to the Group Secretary, Mid-Wales Hospital Management Committee, General Hospital, Aberystwyth, immediately.

ASCOT, BERKSHIRE. HEATHERWOOD ORTHO-PÆDIC HOSPITAL. (212 Beds—Adults and Children.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR (resident) required at above Hospital. Hospital is a regional centre for all general orthopædic conditions, including fractures; there is also a large amount of outpatient work. Post recognised for F.R.C.S. Candidates may visit Hospital by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, Berks, by 4th July.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Resident HOUSE SURGEON (pre-registration) required immediately. The appointment offers exceptional opportunity for general experience in a busy acute Surgical Unit.

Applications, stating age, nationality, qualifications, previous appointments, together with copies of 2 testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (437 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required for busy acute Orthopædic and Traumatic Department at above Hospital. Previous orthopædic experience desirable. Candidates may visit Hospital by appointment with Group Secretary.

Application forms obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, as soon as possible.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Locum REGISTRAR required for busy acute Orthopædic and Traumatic Department for approximately 2 months. Previous orthopædic experience desirable.

Applications, stating age, nationality, qualifications, previous appointments, together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM. ROYAL ORTHOPÆDIC HOSPITAL. (Long and short term orthopædic cases (non-traumatic)—334 Beds and extensive outpatient services.) Applications are invited from registered medical practitioners, preferably with previous orthopædic experience, for 2 SENIOR HOUSE OFFICER posts vacant shortly.

Apply, to Administrator, 80, Broad-street, Birmingham, 15.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL, near BIRMINGHAM. HOUSE SURGEON (pre-registration). Obstetrics. General Hospital. 5 other resident Medical staff. Post vacant now.

Applications to Medical Superintendent.

BIRMINGHAM, 13. SORRENTO MATERNITY HOS-PITAL. (112 Beds, including 24 premature baby cots.) OBSTETRIC HOUSE SURGEON. Appointment recognised for D.Obst.R.C.O.G. Hospital affiliated to Birmingham Medical School for training of students. Post vacant 1st August, 1954.

Applications to Obstetrician before 30th June, 1954.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (790 Beds.) HOUSE SURGEON (resident) required. Post recognised for pre-registration and F.R.C.S.(Eng.). This appointment, vacant on 10th July, 1954, is in a Unit of General Surgery of approximately 80 adult general surgical beds and 10 children's surgical beds under the control of 2 Consultant Surgeons.

Detailed applications, with copies of 3 recent testimonials, to Secretary.

BIRMINGHAM (near). MARSTON GREEN MATER-NITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics) required on 1st September, 1954. 128 obstetric and 10 gynæcological beds. Post recognised for Diploma and Obstetric part of Membership of Royal College of Obstetricians and Gynæcologists. Premature Baby Unit. Hospital affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to Hospital Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. **The Birmingham Dudley Road Group, Dudley Road Hospital, Birmingham, 18**

RESIDENT SURGICAL REGISTRAR for St. Chad's Hospital (50 general surgical beds). Recognised for F.R.C.S. Higher qualification an advantage.

2. **Birmingham (Sanatoria) Group Hospital Management Committee, Yardley Green Hospital, Birmingham, 9**

REGISTRAR in Tuberculosis for Yardley Green Hospital (413 Beds). Duties also at Birmingham Chest Clinic. Resident accommodation available. Experience specialty desirable.

3. **Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29**

REGISTRAR in Accident Surgery, Birmingham Accident Hospital. Duties as Surgical Registrar to Clinical Director. Hospital recognised for F.R.C.S. Resident. Large Traumatic Unit. 50,000 new patients annually. Opportunity for practical experience in all types of injury.

4. **Shrewsbury Group Hospital Management Committee, Royal Salop Infirmary, Shrewsbury**

REGISTRAR in Tuberculosis (resident). Duties mainly at Shirlett Sanatorium (65 Beds) and clinics in Shrewsbury area. Experience specialty essential. Vacant 23rd July, 1954.

5. **South Worcestershire Hospital Management Committee, Worcester Royal Infirmary**

REGISTRAR in Gynæcology and Obstetrics for Worcester Royal Infirmary and Ronkswood Hospital. Unit of 76 Beds recognised for M.R.C.O.G. Single or married quarters available.

6. **Walsall Hospital Management Committee, Walsall General Hospital, Wednesbury-road, Walsall**

REGISTRAR in General Surgery for Manor Hospital (333 Beds). Experience specialty essential. Resident.

7. **Wolverhampton Group Hospital Management Committee, The Royal Hospital, Wolverhampton**

(*a*) RESIDENT SURGICAL REGISTRAR for New Cross Hospital (636 Beds) with some duties at The Royal Hospital (310 beds); preferably F.R.C.S. Vacant now.

(*b*) REGISTRAR in Diagnostic Radiology for The Royal Hospital. Vacant now. At least Part 1 of Diploma of Medical Radiology essential. Duties also at other Group hospitals.

(*c*) CASUALTY OFFICER (Registrar) for The Royal Hospital, Hospital recognised for F.R.C.S. Resident.

Application forms from Group Secretaries, to be returned before 12th July, 1954. Candidates may visit hospitals.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the posts of RESIDENT REGISTRAR in Anæsthetics for duties in the United Hospitals and resident at the Queen Elizabeth Hospital. The appointments are tenable for 1 year in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A.R.C.S.

Application forms may be obtained from the Secretary to the Board of Governors, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him not later than 17th July, 1954.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited from registered medical practitioners for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty with the Professorial Unit, vacant 1st October, 1954. The appointment is recognised for the M.R.C.O.G.

Application forms obtainable from the House Governor at the above address, to be returned not later than 10th July, 1954.

G. A. PHALP, Secretary.

BIRMINGHAM, 18. WINSON GREEN MENTAL HOS-PITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (Male or Female), resident. Salary £745 p.a., less £125 p.a. charge for services. The post, which will be for 1 year in the first instance, will be subject to the terms and conditions of service for medical and dental staffs and subject to the National Health Service superannuation regulations. The Hospital is associated with the University of Birmingham for the teaching of psychiatry, and training for the Diploma in Psychological Medicine will be provided.

Applications, stating age and qualifications, to be sent to the Medical Superintendent at the Hospital.

BISHOP AUCKLAND GENERAL HOSPITAL. (350 Beds.) Applications are invited from registered practitioners or pre-registration candidates for the post of HOUSE PHYSICIAN (vacant early August). Salary £425–£525 p.a. according to previous posts held, less £125 p.a. for full residential emoluments.

Applications, stating age, nationality, qualifications and experience, to be sent, with names of 2 referees, to the undersigned as soon as possible.

K. G. T. LUXFORD, Group Secretary/Finance Officer,
South West Durham Hospital Management Committee.
The General Hospital, Bishop Auckland.

BISHOP AUCKLAND GENERAL HOSPITAL. (350 Beds.) Applications are invited from registered practitioners or pre-registration candidates for the post of HOUSE SURGEON (general surgery—72 Beds). Salary £425–£525 p.a. according to previous posts held, less £125 p.a. for full residential emoluments.

Applications, stating age, nationality, qualifications and experience, to be sent, with names of 2 referees, to the undersigned as soon as possible.

K. G. T. LUXFORD, Group Secretary/Finance Officer,
South West Durham Hospital Management Committee.

The General Hospital, Bishop Auckland.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts which fall vacant around beginning of July, 1954 :—

Victoria Hospital, Accrington (112 acute beds)
SENIOR HOUSE OFFICER (medicine).
HOUSE SURGEON recognised for pre-registration purposes, and for F.R.C.S.

Apply to Secretary of the Committee, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required. Residence and duties mainly at Queen's Park Hospital, Blackburn, with sessions at the Blackburn Royal Infirmary and Accrington Victoria Hospital as arranged by the Consultant Anæsthetist. Post recognised for D.A. and F.F.A.R.C.S.

Apply to Secretary of the Committee, Royal Infirmary, Blackburn.

BLACKPOOL. VICTORIA HOSPITAL. (344 Beds.)
(1) SENIOR HOUSE OFFICER (Orthopædic and Casualty Department), vacant 20th July, 1954. Recognised for 6 months casualty training for Final F.R.C.S. examination.
(2) HOUSE SURGEON (casualty), vacant 1st September, 1954. Recognised for 6 months casualty training for Final F.R.C.S. examination.
(3) RESIDENT HOUSE SURGEON (Surgical Department), vacant 14th September, 1954. Recognised for F.R.C.S.
(4) HOUSE PHYSICIAN, vacant 31st July, 1954.

This is a busy general hospital with a large Outpatient Department and the posts offer excellent opportunities for experience under Consultant staff.

Applications, with names and addresses of referees should be sent to the Hospital Secretary.

BLACKPOOL. GLENROYD MATERNITY HOSPITAL. (60 Beds.) BLACKPOOL AND FYLDE HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (obstetrics), resident, vacant 8th August, 1954.

Applications, together with names of referees, should be sent to the Group Secretary, Blackpool and Fylde Hospital Management Committee, Victoria Hospital, Blackpool.

BOLTON. THE ROYAL INFIRMARY. (237 Beds.) BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER in Orthopædic Surgery. Tenable for 12 months and recognised for F.R.C.S.

RESIDENT HOUSE SURGEON for general surgical duties. Tenable for 6 months and recognised under the Pre-registration Service Scheme. Also recognised for F.R.C.S.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent immediately to—

H. P. TRAVIS, Group Secretary.

The Royal Infirmary, Bolton.

BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. ROYAL VICTORIA HOSPITAL, Poole-road, WESTBOURNE, BOURNEMOUTH. Applications are invited for the appointment of HOUSE SURGEON for E.N.T. and ophthalmic duties, vacant 18th July, 1954. In addition to duties at the above Hospital, the successful candidate will be required to assist in the E.N.T. outpatient clinics at the Royal Victoria Hospital, Shelley-road, Boscombe, and the Poole General Hospital. The appointment is recognised for the D.O. and D.L.O. Diplomas but not for pre-registration purposes.

Applications to the Deputy Hospital Secretary, Royal Victoria Hospital, Shelley-road, Boscombe, Bournemouth.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HANTS. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required for General Medicine, post vacant 2nd August, 1954. The Hospital comprises 61 acute medical beds, 188 chronic sick, 34 pædiatric and 6 chest diagnostic.

Applications, with copies of testimonials, to the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe, Bournemouth.

BROMSGROVE. ALL SAINTS' HOSPITAL. (423 Beds.) SENIOR HOUSE OBSTETRICIAN AND GYNÆCOLOGIST required at the above Hospital, at present 31 maternity, 12 gynæcological, beds. Salary £745 p.a. Post vacant early July.

Applications, with the names of 3 referees, to Hospital Secretary.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON to the General Surgical Unit (60 Beds), recognised for F.R.C.S. The post will be vacant about 23rd July, 1954. Salary in accordance with national scale. The post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, experience and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON. NEW SUSSEX HOSPITAL FOR WOMEN, Windlesham-road. HOUSE PHYSICIAN (Female) for a period of 6 months from 9th August, 1954. Pre-registration candidates may apply.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to the Administrative Officer as soon as possible.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (300 Beds.) Applications are invited for the following posts :—

HOUSE SURGEON. Pre-registration and recognised for F.R.C.S.

CASUALTY HOUSE SURGEON (1 of 3). Duties include work in Orthopædic and Traumatic Unit. Pre-registration and recognised for F.R.C.S.

Both vacant mid-July.

Applications, stating age, qualifications and experience, naming 2 referees, to be sent to the Administrative Officer.

BRISTOL CLINICAL AREA. The Board of Governors OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in Anæsthetics. The appointment will be held for 1 year in the first instance, and be renewable for a further year. The successful candidate will be required to work for the first year mainly at Southmead Hospital, Bristol, but may be required to undertake duties at other hospitals in the Group as circumstances require.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 10th July, 1954.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (513 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the regional Neurosurgery Department, vacant 1st August, 1954. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a Male JUNIOR ASSISTANT VENEREOLOGIST (non-resident). The duties of the successful candidate will be primarily in connection with V.D. He will be attached to Frenchay Hospital and in addition will be required to undertake duties in the various Bristol area clinics. Previous experience in venereology an advantage. The appointment will be subject to the National Health Service superannuation regulations and terms and conditions for hospital medical staff. Salary scale £700–£50–£1000 p.a.

Applications, with full particulars of age, qualifications and experience, and the names and addresses of 3 referees, should reach the Secretary, Frenchay Hospital, Bristol, not later than 3rd July, 1954.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. THORACIC SURGERY DEPARTMENT. HOUSE SURGEON required in the above Department, which is the regional Thoracic Surgery Centre (120 Beds) for the South West.

Applications, with full particulars, should be addressed to the Group Secretary, Frenchay Hospital, Bristol, quoting "Thoracic."

BRISTOL. STAPLETON HOSPITAL. (750 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER. Salary £775–£50–£1075. Furnished accommodation available, together with board and laundry, for which a charge of £120 p.a. is made. If a married man is appointed a self-contained flat in close proximity to the Hospital at an economical rent is available. The Hospital caters for acute and chronic illness in the older age groups. All ancillary services available. Consultant staff visit regularly and there is ample time for postgraduate study.

Applications stating age, nationality, whether married or single, experience, qualifications, and names and addresses of 2 referees, to be sent to the Group Secretary, Stapleton Hospital Management Committee, 200, Manor-road, Fishponds, Bristol, within 14 days of the appearance of this advertisement.

BRADFORD ROYAL INFIRMARY. House Officer (anæsthetics), vacant now. Recognised for D.A. and F.F.A. R.C.S. Opportunities for plastic and intra-thoracic experience. Salary £425–£525 p.a., less £125 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary.

BRADFORD. ST. LUKE'S HOSPITAL. House Officer (anæsthetics), vacant now. Recognised for D.A. and F.F.A. R.C.S. Opportunities for plastic and intra-thoracic experience. Salary £425–£525 p.a., less £125 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRENTWOOD, ESSEX. HIGH WOOD HOSPITAL FOR CHILDREN. Temporary REGISTRAR required for 3 months from 28th June. The Hospital admits cases of pulmonary tuberculosis in children. Possibility of a permanent vacancy later.

Please apply to Senior Physician.

BURTON-ON-TRENT GENERAL INFIRMARY. (251 Beds.) RESIDENT HOUSE SURGEON required for General Surgical Unit. Designated for Pre-registration Service. The Hospital is recognised for the F.R.C.S.

Applications, with full details, naming 2 referees, should be sent to the Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. ROSSENDALE GENERAL HOSPITAL. SENIOR HOUSE OFFICER (obstetrics), resident or non-resident, for Obstetric/Gynæcological Unit consisting of 24 obstetric and 8 gynæcological beds.

Applications to H. WILKINSON Esq., Group Secretary.
Bury General Hospital, Bury, Lancs.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. Locum DERMATOLOGICAL REGISTRAR (part-time) required for 2 half-days per week for 4 weeks from 3rd July, with possibility of indefinite extension.

Apply to Group Secretary at above address.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House SURGEON for 6 months from 28th August. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications, and experience with dates, and copies of 3 testimonials, to Secretary by 10th July. Interviews 14th July.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Resident ANÆSTHETIC SENIOR HOUSE OFFICER for 1 year from 18th August. Anæsthetic experience essential.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary by 10th July. Interviews 22nd July.

CARDIFF. ROOKWOOD HOSPITAL, Llandaff, Cardiff. SENIOR HOUSE OFFICER (surgical) required at the above War Pensioners' Hospital. Whitley Council salary and conditions.

Application forms will be sent on request by Hospital Management Branch, Ministry of Health, Norcross, Blackpool, Lancashire.

CARLISLE. CUMBERLAND INFIRMARY. (340 Beds.) HOUSE OFFICER (general surgery) required immediately for period of 6 months or Locum for shorter period. This post is recognised for the F.R.C.S. examination, and pre-registration practitioners are eligible to apply.

Applications, with 2 names for reference, to be sent to the Secretary.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (pre-registration post). The post will become vacant on 24th July and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL, London-road, CHELMSFORD. (161 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre-registration post), to work in the general medical wards of the above Hospital. Duties will commence 7th August.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female), commencing 17th July, 1954. To work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a Premature Baby Nursery of 10 cots and a Neonatal Department in the maternity block of the Hospital. The work is recognised for the D.C.H.

Applications, together with recent testimonials, should be sent, not later than 8th July, to the Secretary, Hospital Management Committee—Chelmsford Group, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHEPSTOW, MONMOUTHSHIRE. ST. LAWRENCE HOSPITAL. (150 Beds.) PLASTIC SURGERY, JAW INJURIES AND BURNS CENTRE. SENIOR HOUSE OFFICER (resident) in Plastic Surgery required. Previous experience in specialty not essential. The successful candidate will receive a thorough training in plastic surgery and burns. Hospital intakes from most of Wales and post provides extensive experience. Salary £745, less £150 for board-residence.

Write, quoting 2 referees, to Group Secretary, 64, Cardiff-road, Newport, Mon.

CHESTERFIELD ROYAL HOSPITAL. (324 Beds.) CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointments of 2 HOUSE SURGEONS at the above Hospital. The posts, which are recognised for Pre-registration Service, become vacant early in July. Salary £425, £475, or £525 p.a. according to experience, less £125 p.a. for residential emoluments.

Please apply in detail to M. H. BOONE, Secretary, from whom particulars of the Hospital are obtainable.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the following post :—

Essex County Hospital, Colchester (189 Beds)
HOUSE OFFICER (surgical). First, second, third, or pre-registration post ; tenable for 6 months.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the following posts :—

Clacton and District Hospital, Clacton-on-Sea (58 Beds)
SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

SENIOR HOUSE OFFICER (Resident Casualty Officer) required temporarily during summer months to mid-September.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, 14, Pope's-lane, Colchester, Essex.

CROYDON. ST. MARY'S MATERNITY HOSPITAL. (33 Beds.) SENIOR HOUSE OFFICER (resident). Post, which is recognised for D.Obst.R.C.O.G., vacant from 18th July. Candidate required to undertake certain duties at Mayday Hospital. Post offers opportunity for reading.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Croydon Group Hospital Management Committee, General Hospital, Croydon.

DARLINGTON MEMORIAL HOSPITAL. (210 Beds.) DARLINGTON DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON (resident) which post is recognised for the F.R.C.S. (Eng.). Salary in accordance with national scale.

Apply, giving age and references, to the undersigned forthwith.

G. W. BECKWITH, Group Secretary.

CREWE MEMORIAL HOSPITAL. (110 Beds and Annexe 34 Beds—General.) SOUTH CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (medical) required at the above Hospital. Salary £745 p.a., less £140 p.a. for board and lodging. Post vacant 1st August, 1954.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, should be sent to the Group Secretary, Barony Hospital, Nantwich, as soon as possible.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER, vacant now. Recognised for D.C.H.

Applications, with 2 names for reference, should be sent to the Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (anæsthetics), vacant 1st September, 1954. Recognised for D.A.

Applications, stating full particulars with copies of 2 testimonials, to be sent as soon as possible to the Secretary at the Infirmary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (pre-registration) or SENIOR HOUSE OFFICER, General Surgery.

Applications, stating full particulars, with copies of 2 testimonials, to be sent as soon as possible to the Secretary at the Infirmary.

DEWSBURY. STAINCLIFFE GENERAL HOSPITAL. (314 Beds.) HOUSE OFFICER (general medicine and pædiatrics), first, second, or third post, vacant 1st August, 1954, and tenable for 6 months. Recognised pre-registration appointment. Hospital has 68 adult acute medical and 34 pædiatric beds. It is recognised for the D.C.H.

Applications, with full particulars, to the Administrative Officer at the Hospital, quoting Ref. (L).

DONCASTER ROYAL INFIRMARY. (330 Beds.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN. The post is approved for Pre-registration Service.

Applications, stating age, qualifications with dates and nationality, and accompanied by copies of 3 recent testimonials, should be forwarded to the Secretary to the Committee at the Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds. Recognised under the regulations for the Fellowship examination of the Royal College of Surgeons.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON. The post is approved for Pre-registration Service.

Applications, stating age, qualifications with dates, and nationality and accompanied by copies of 3 recent testimonials, should be forwarded to the Secretary to the Committee at the Doncaster Royal Infirmary.

DORKING GENERAL HOSPITAL, Horsham-road, Dork-ING. (234 Beds.) REDHILL GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical), vacant 1st August, 1954. Excellent general surgical experience.

Apply to the Medical Superintendent.

DOVERCOURT. HARWICH AND DISTRICT HOS-PITAL. (30 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DOVER, KENT. BUCKLAND HOSPITAL. Applications are invited for 2 appointments of HOUSE PHYSICIAN which will shortly become vacant at the above Hospital. Salary £425, £475 or £525 a year, less a deduction of £125 a year for residential emoluments.

Applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be made to the Group Secretary, South-East Kent Hospital Management Committee, "Ash-Eton," Radnor Park West, Folkestone.

DOVER. ROYAL VICTORIA HOSPITAL. Applications are invited for the post of HOUSE SURGEON at the above Hospital. The post is recognised by the Royal College of Surgeons. Salary £425, £475, or £525 a year, according to experience. A deduction of £125 a year will be made for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (Fracture Department), vacant 20th August, 1954.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary, by 10th July, 1954.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (medical and pædiatrics), vacant 11th August, 1954.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 3rd July, 1954.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (E.N.T. Department—31 Beds), vacant now. The post is recognised for the F.R.C.S. examination.

Applications, with copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners, for the appointment of HOUSE SURGEON (Obstetric and Gynæcological Department), vacant 24th August, 1954.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 3rd July, 1954.

EAST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. Appointment of House Officers. Applications are invited for the following appointments: —

Cumberland Infirmary, Carlisle (340 Beds)

1 HOUSE OFFICER (" Specials "—E.N.T. and Eyes).

1 SENIOR HOUSE OFFICER (orthopædics).

Applications, with names of 2 referees, should be forwarded immediately to the Secretary, East Cumberland Hospital Management Committee, Cumberland Infirmary, Carlisle.

EAST FIFE HOSPITALS BOARD OF MANAGEMENT. CRAIGTOUN MATERNITY HOSPITAL, ST. ANDREWS (41 Beds), AND ASSOCIATED ANTENATAL CLINICS. Applications are invited for the appointment of 2 RESIDENT HOUSE OFFICERS at the above Hospital. The posts will become vacant on 1st August and 1st October, 1954, and the tenure of each will be for 6 months. At present only 1 of the posts qualifies for pre-registration. Salary in accordance with national scale.

Apply, with references, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT PÆDIATRIC HOUSE PHYSICIAN for above Hospital. Post vacant 27th July, 1954. Salary according to experience. 6 months appointment.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 3rd July, 1954. Candidates selected for interview will be notified by 10th July, 1954.

EDINBURGH. ROYAL HOSPITAL FOR SICK CHILDREN. Applications are invited from registered medical practitioners for 2 appointments for 12 months of SENIOR HOUSE OFFICER (1 surgical commencing 1st October, 1954; 1 medical commencing 1st September, 1954.) Whitley Council scale.

Applications, stating age, qualifications and experience and names of 2 referees, to be sent immediately to Medical Superintendent, Edinburgh Central Hospitals, 18, Rillbank-terrace, Edinburgh, 9.

EDINBURGH. PRINCESS MARGARET ROSE HOSPITAL. Applications are invited from registered medical practitioners for appointment of SENIOR HOUSE OFFICER for 12 months commencing 1st October, 1954. Whitley Council scale.

Applications, stating age, qualifications and experience and names of 2 referees, to be sent immediately to Medical Superintendent, Edinburgh Central Hospitals, 18, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Appointment of RESIDENT HOUSE SURGEON (second or third post), vacant 7th August, 1954. Duties with General Surgical Unit which includes some orthopædics. 6 months appointment. Post recognised by the Royal College of Surgeons.

Applications, with the names and addresses of 2 referees, to the Secretary of the Management Committee.

EPSOM, SURREY. HORTON HOSPITAL. Horton HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGION. Applications are invited for the post of SENIOR REGISTRAR in Psychiatry with duties at above Hospital. Applicants must possess the D.P.M. and have had experience in adult psychiatry. Residential accommodation is available for a single person. Candidates may visit the Hospital by arrangement with the Physician-Superintendent.

Forms of application obtainable from the Secretary, Horton Hospital, Epsom, Surrey, to whom they should be returned, duly completed, not later than 9th July, 1954.

FOLKESTONE. ROYAL VICTORIA HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON which is recognised for Pre-registration Service. The duties will be mainly obstetrical and gynæcological with some general surgery. The post will become vacant on 19th July, 1954. Salary £425, £475 or £525 a year, less a deduction of £125 a year for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, " Ash-Eton," Radnor Park West, Folkestone.

GLASGOW. HAWKHEAD (MENTAL) HOSPITAL, 510, Crookston-road, GLASGOW, S.W.3. Applications are invited for the post of SENIOR HOUSE OFFICER in Psychiatry (Male or Female), resident or non-resident. The post offers wide experience and training in all aspects of psychiatry (in-patient and outpatient), and all modern methods of treatment are carried out. Recognised for D.P.M.

Applications, together with the names of 2 referees, should be forwarded as soon as possible to Physician-Superintendent at above address.

GLASGOW, N. STOBHILL GENERAL HOSPITAL. PSYCHIATRIC UNIT. HOUSE OFFICERS (resident), Male or Female, required now. (180 Beds.) 1200 admissions yearly. Acute treatable cases. Unit recognised for D.P.M. Salary £50 above standard rate.

Apply to Medical Superintendent.

GLASGOW, N. STOBHILL GENERAL HOSPITAL. Vacancies for HOUSE OFFICERS exist in the following units for the term beginning 1st August, 1954.

Dermatology Unit.
Phthisis Unit.
Surgical Unit.
Ear, Nose and Throat Unit.

Applications should be sent to the Medical Superintendent.

GLASGOW, N. STOBHILL GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the acute Geriatric Unit (70 Beds—for assessment and rehabilitation), supervised by a Consultant Physician specialising in geriatrics. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly, and will be for 2 years in the first instance.

Applications, stating age, qualifications and experience, with the names of 2 referees, should be sent to the Medical Superintendent.

GLASGOW, S.W.1. DAVID ELDER INFIRMARY. (50 gynæcological beds.) JUNIOR HOUSE OFFICER required for 1st August, 1954, for above Gynæcological Unit. Post recognised by University as pre-registration appointment.

Apply, in writing, immediately to Medical Superintendent.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Orthopædics. Duties at above Infirmary.

Write, giving 3 names for reference, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW, S.W.1. SOUTHERN GENERAL HOSPITAL. SENIOR HOUSE OFFICER in Medicine.

Write to Secretary, Board of Management for Glasgow South-Western Hospitals, 1301, Govan-road, Glasgow, S.W.1, naming 2 referees, by 20th July, 1954.

GRIMSBY GENERAL HOSPITAL. (226 Beds.) Grimsby HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER for Orthopædic, Fracture and Accident Service. Previous surgical and orthopædic experience would be an advantage. Post recognised for F.R.C.S. Excellent Medical Library facilities.

Applications should be sent immediately to the Hospital Secretary, Grimsby General Hospital.

GRIMSBY GENERAL HOSPITAL. (226 Beds.) Grimsby HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (gynæcological). Male or Female, for duties at the above-named Hospital and Scartho Road Infirmary, Grimsby. A Locum appointment would be considered.

Applications, with the names of 2 referees, to Hospital Secretary, Grimsby General Hospital.

GRIMSBY GENERAL HOSPITAL. (226 Beds.) Grimsby HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR (pre-registration) or SENIOR HOUSE OFFICER (surgical), vacant from 1st August, 1954.

Applications, with names of 2 referees, to Hospital Secretary, Grimsby General Hospital.

HALIFAX GENERAL HOSPITAL. (425 Beds.) House SURGEON required. Approved pre-registration appointment. Post vacant July.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX GENERAL HOSPITAL. House Physician required for Pædiatric Unit of 35 Beds. Approved pre-registration appointment and recognised for D.C.H. Post vacant July.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX GENERAL HOSPITAL. (425 Beds.) House PHYSICIAN required. Approved pre-registration appointment.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Junior HOSPITAL MEDICAL OFFICER in Anæsthetics required. Opportunities for studying for D.A. Board-residence available.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ST. JOHN'S HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital which has 382 Beds for geriatric cases and chronic sick patients. Good facilities for modern method of treating geriatric cases. Pathological Laboratory ; Physiotherapy and Occupational Therapy Departments situated at the Hospital.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) HOUSE SURGEON (E.N.T. and ophthalmology) required. Post now vacant. Approved pre-registration appointment.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in General Surgery required. Post vacant late July.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) SENIOR HOUSE OFFICER (casualty and orthopædic). Post vacant 1st August. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (497 Beds.) HOUSE PHYSICIAN (resident) for Pædiatrics and General Medicine. National scale of salary. Post vacant now.

Apply to Hospital Administrator.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER for general surgical duties at the above Hospital. Salary in accordance with the approved scales—viz., £745 p.a., less £145 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £425, £475 and £525 p.a., according to experience (plus special grant of £50 p.a.), less £125 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HEMEL HEMPSTEAD, HERTFORDSHIRE. West Herts HOSPITAL. (167 Beds.) HOUSE SURGEON (pre-registration).

Applications, accompanied by copies of 2 recent testimonials, should be sent to the Hospital Secretary at once.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (General—second post), to commence 5th August, 1954. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Group Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident SENIOR HOUSE OFFICER (casualty) for duty with the Accident Service and as Orthopædic House Surgeon, required, for 6 months in the first instance, on 26th July, 1954.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to be sent immediately to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

HOVE GENERAL HOSPITAL, Sussex. House Surgeon AND CASUALTY OFFICER (recognised for F.R.C.S.) required as soon as possible. Salary £525, less £125 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and naming 2 referees, to the Administrative Officer.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required, to commence duty immediately. The post is recognised as a pre-registration appointment. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited from provisionally registered or registered medical practitioners for the post of HOUSE SURGEON to the Princess Royal Maternity Home (57 Beds), to commence duty on 1st August, 1954. The holder of the post, which is recognised for the D.Obst.R.C.O.G., will have access to the abnormal maternity and gynæcological beds at The Royal Infirmary. The Department is under the control of 2 Consultant Obstetricians and Gynæcologists. Salary in accordance with national scale.

Applications to be addressed to—

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. KINGSTON GENERAL HOSPITAL. (447 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE SURGEON (recognised for the F.R.C.S. examinations). There are 69 general surgical beds and some supervision is required of 17 gynæcological beds. Salary £745, less emoluments. Post now vacant.

Applications with names of referees, to the Secretary, Hull A Group Hospital Management Committee.

HULL. KINGSTON GENERAL HOSPITAL. (447 Beds.) Applications are invited for the pre-registration appointment of HOUSE OFFICER (general surgery). Recognised for the F.R.C.S. examinations. Salary £425, £475, or £525 according to experience. The post is resident and tenable for 6 months. Vacant 1st July, 1954.

Applications, with full particulars, to the Secretary, Hull A Group Hospital Management Committee.

ILFORD, ESSEX. KING GEORGE HOSPITAL. Ilford AND BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE. There will be vacancies for the following at the above Hospital.

HOUSE SURGEON—24th July, 1954.
HOUSE SURGEON—29th July, 1954.
HOUSE SURGEON—20th August, 1954.

Post or pre-registration.

Applications, giving full particulars and accompanied by testimonials, to be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Deputy Group Secretary.

King George Hospital, Ilford.

ILFORD, ESSEX. KING GEORGE HOSPITAL. Ilford AND BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy for a HOUSE PHYSICIAN (post or pre-registration) at the above Hospital on 16th July, 1954. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Deputy Secretary.

King George Hospital, Ilford.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (resident Anæsthetist). The post, which is normally of 1 years duration, is recognised for the D.A. and the F.F.A.R.C.S. examinations.

Applications, stating age, nationality, together with recent testimonials, to Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of SENIOR HOUSE SURGEON to the Fracture and Orthopædic Department. The post is graded Senior House Officer and is recognised for the F.R.C.S. examinations. The Department has 2 Consultants, about 60 Beds and a large outpatients attendance and offers a wide experience.

Applications, stating age, nationality, experience and copies of 3 recent testimonials, to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOS-PITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IRVINE, AYRSHIRE. CENTRAL HOSPITAL. Board of MANAGEMENT FOR NORTHERN AYRSHIRE HOSPITALS. Applications are invited from registered medical practitioners for the post of ASSISTANT BACTERIOLOGIST AND CLINICAL PATHOLOGIST (Junior Hospital Medical Officer) at the County Laboratory, at above Hospital, vacant now. National terms. Applicants should have had some experience in bacteriology and preferably also in hæmatology.

Apply immediately, enclosing copies of 3 testimonials, to Area Medical Superintendent, 1, Hill-street, Kilmarnock.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Specials Unit which comprises E.N.T. Plastics and Ophthalmic Departments. Candidates should have held medical and surgical house posts.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 7th July, 1954.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Maternity Department. Must have held medical, surgical, obstetrical and gynæcological house posts.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 8th July, 1954.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Dermatological Unit. Candidates must have held medical and surgical house posts and previous experience in dermatology desirable. Post suitable for anyone intending to specialise in this subject.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 7th July, 1954.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Psychiatric Unit. Duties mainly in observation wards. Post recognised by Conjoint and R.M.P.A. as D.P.M. training post.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 6th July, 1954.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICERS (2) required for general medicine.

Applications, stating age, nationality, qualifications obtained with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 6th July, 1954.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICER required for Maternity Unit.

Applications, stating age, nationality, qualifications obtained, with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 6th July, 1954.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL. (112 Beds.) HOUSE SURGEON required at the above Hospital. Post vacant early July. Salary £425–£525 according to experience.

Applications, with the names of 3 referees, to the Hospital Secretary.

LEEDS A GROUP HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetics) for duties mainly at St. James's Hospital. The appointment, which is recognised for the D.A. and the F.F.A. R.C.S., will be for a period of 1 year, and the salary will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs—namely, £745 p.a., with an appropriate deduction in respect of board, lodging, and other services provided.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER (pre-registration post) to the Department of Urology at the General Infirmary at Leeds. The post, which is resident, will be for a period of 6 months in the first instance.

Applications, stating age, qualifications and previous posts with dates, should be forwarded to the undersigned not later than 7th July, 1954.

J. ARNOLD TUNSTALL, Secretary to the Board.

The General Infirmary, Leeds, 1.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of REGISTRAR in Anæsthetics. The appointment will be for 1 year in the first instance.

Applications, giving full details of previous experience, together with the names of 3 referees, should be forwarded to the Sub-Dean, School of Medicine, Leeds, 1, not later than 5th July, 1954.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts :—

Anæsthetics

Duties in the Harrogate and Ripon Group, mainly at Harrogate General Hospital (resident/non-resident).

General Surgery

St. Luke's Hospital, Bradford (150 general surgical beds) (non-resident). Recognised for the F.R.C.S.

General and Plastic Surgery

St. Luke's Hospital Bradford (150 general surgical beds). Half the duties will be in the Plastic Unit (20 Beds) (preferably resident).

Orthopædic Surgery

(*a*) Hull A Group (50 orthopædic beds), Hull B Group and East Riding Group (50 orthopædic beds) (non-resident). Includes some duties in the Casualty Department at the Hull Royal Infirmary.

(*b*) Huddersfield Royal Infirmary and other hospitals in the Huddersfield Group (34 orthopædic beds) (non-resident).

(*c*) The General Hospital, Batley (36 orthopædic beds) and other hospitals in the Dewsbury Batley and Mirfield Group (resident).

Psychiatry

Psychiatric Unit, St. James's Hospital, Leeds (resident). Offers special opportunity for experience with neurotic and psychosomatic patients.

Thoracic Surgery

Pinderfields General Hospital, Wakefield. Experience in thoracic surgery desirable. 53 Beds under the Consultants to the Teaching Hospital. (Resident.)

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 1st July, 1954.

LEEDS. SEACROFT HOSPITAL, York-road. House SURGEON required immediately for above Hospital for children's wards for general, ophthalmic and E.N.T. surgery. Recognised pre-registration post.

Apply, giving full details and names of 2 referees, to Group Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP. RESIDENT HOUSE SURGEON (general surgery). Post vacant now. Recognised for pre-registration. Post provides excellent experience. Good accommodation available.

Apply Hospital Secretary.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. (164 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER for duty in the E.N.T., Ophthalmic and Gynæcological Departments.

Full particulars, stating age, qualifications and experience, should be addressed to the Hospital Secretary, Llanelly Hospital, Marble Hall-road, Llanelly.

LOWESTOFT AND NORTH SUFFOLK HOSPITAL. LOWESTOFT. (99 Beds.) Applications are invited for the appointment of SENIOR HOUSE SURGEON. Salary £745 p.a., less £150 for residential emoluments. The Hospital is staffed by Consultant General Surgeons and visiting Consultants in all specialties from the Norfolk and Norwich Hospital.

Applications, stating age, qualifications and experience with names of 2 referees, to Hospital Secretary, immediately.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery and E.N.T.

Applications, giving full particulars, should be addressed to—
R. W. HOWICK, Group Secretary.

LINCOLN. ST. GEORGE'S HOSPITAL. (178 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident) to assist the Resident Medical Officer at the above Hospital which has medical, surgical, orthopædic, and geriatric beds.

Applications, giving full particulars, together with 3 names for reference, should be addressed to—
R. W. HOWICK, Group Secretary.
County Hospital, Lincoln.

LIVERPOOL. BOOTLE HOSPITAL. (119 Beds.) HOUSE SURGEON (general surgery) required 1st July, 1954, or as soon after as possible. Recognised pre-registration post.

Applications to Secretary, North Liverpool Hospital Management Committee, Walton Hospital, Liverpool, 9.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds, 116 Cots.) Applications are invited for the following resident appointments which will become vacant at the above-named Hospital on 1st September, 1954, and will be for a period of 6 months. These posts are approved as pre-registration posts.

5 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
2 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned, to whom they should be returned not later than Thursday, 8th July, 1954.

GARNET CHAPLIN, Secretary to the Committee,
South Liverpool Hospital Management Committee.

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LIVERPOOL. WALTON HOSPITAL. (1321 Beds.) The following resident posts are vacant from the dates stated :—

Vacant now.
HOUSE SURGEONS (general surgery).
1st September, 1954.
HOUSE PHYSICIANS (general medicine).
HOUSE SURGEONS (general surgery).
HOUSE SURGEON (orthopædics).
1st October, 1954.
HOUSE SURGEONS (gynæcology).

All these posts are recognised for Pre-registration Service.

Applications, stating age, date of qualification, experience and enclosing 2 copies of recent testimonials, to the Physician-Superintendent, Walton Hospital, Liverpool, 9.

LIVERPOOL. WALTON HOSPITAL. (1321 Beds.) SENIOR HOUSE OFFICER (neurosurgery), vacant now.

Applications, stating age, date of qualification and experience, with copies of 2 recent testimonials, to Physician-Superintendent.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Applications are invited for the post of HOUSE SURGEON, vacant 1st July, 1954. Recognised as pre-registration post and for F.R.C.S. The appointment will be for 6 months in the first instance.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 28th June.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Applications are invited for the post of HOUSE SURGEON, vacant 9th July, 1954. Recognised as pre-registration post and for F.R.C.S. The appointment will be for 6 months in the first instance.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 5th July.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. SENIOR HOUSE OFFICER (resident) in Medicine required.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 30th June.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Post vacant July, 1954. Salary at the rate of £425, £475 to £525 according to experience. A deduction at the rate of £125 a year is made in respect of board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING-ROOM OFFICER. Post now vacant. Salary £745 a year, with deduction at present of £150 a year for residential emoluments.

Applications to Administrative Officer at Hospital as soon as possible.

MANCHESTER ROYAL EYE HOSPITAL. United MANCHESTER HOSPITALS. Applications are invited for post of SENIOR HOUSE OFFICER. Salary £670 p.a., less £130 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.
H. R. NORTH, General Superintendent.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time resident post of REGISTRAR in General Surgery (recognised for F.R.C.S.(Eng.)) in the Ashton, Hyde and Glossop Group of hospitals.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Astley-road, Stalybridge, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for a post of SURGICAL REGISTRAR (resident or non-resident) at the North Lonsdale Hospital, Barrow-in-Furness. Post recognised for F.R.C.S.

Applications to Group Secretary, Barrow and Furness Hospital Management Committee, 52, Paradise-street, Barrow-in-Furness, not later than 10th July, 1954.

MANCHESTER REGIONAL HOSPITAL BOARD. Royal MANCHESTER CHILDREN'S HOSPITAL. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Surgical Registrar), falling vacant 1st July, 1954. Previous experience in surgery essential. Experience in pædiatric surgery and the Diploma of F.R.C.S. desirable. The Hospital is the chief teaching unit of the University Department of Child Health.

Applications, stating age, nationality and experience, together with names of 3 referees, to be forwarded to the Group Secretary, Salford Royal Hospital, Chapel-street, Salford, 3, to be received within 7 days of appearance of this advertisement.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications for the post of REGISTRAR in E.N.T. Surgery in the South Manchester Group, with principle duties at the Manchester Ear Hospital.

Applications, stating age, qualifications, present post and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology in the West Manchester Group of hospitals with main duties at Park Hospital, Davyhulme. There are 73 obstetric beds, 31 gynæcology beds, and a special care Baby Unit of 7 Beds at Park Hospital. Post recognised for the M.R.C.O.G. Vacant 31st August, 1954. Appointment for 1 year, renewable.

Application forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER REGIONAL HOSPITAL BOARD. Resident REGISTRAR (obstetrics/gynæcology) required early September in the Blackburn and District Hospital Group. Recognised post for F.R.C.O.G. based on Queen's Park Hospital, Blackburn (a general hospital with 83 obstetric/gynæcological beds) with duties at Blackburn Royal Infirmary and Accrington Victoria Hospital.

Application forms obtainable from and returnable to the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of REGISTRAR (resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics. Applicants must have had previous hospital experience in general medicine and surgery, and in obstetrics. The post is recognised for purposes of the M.R.C.O.G. examination. The duties involve clinical responsibility for mothers and babies, and supervision of the work of pre-registration House Officers is also included. The appointment is for 12 months from 1st September, 1954. National scale.

Application forms may be obtained from the undersigned and returned not later than 5th July, 1954.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR REGISTRAR to the Department of Psychiatry, to commence as soon as possible. Applicants must have held house appointments and possess a higher qualification. Whole-time non-resident appointment for 12 months, renewable. The successful applicant will be expected to participate in the teaching of the department and engage in research work. He will also be required to undertake duties in connection with a small unit shortly to be opened in 1 of the Mental Hospitals in the Region.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 14th July, 1954.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Department of Cardiology, to commence on 7th August, 1954. Whole-time non-resident post, tenable for 12 months, renewable for a further 12 months.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 14th July, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) HOUSE OFFICER (general surgery) required, pre- or post-registration. Post vacant 18th July, 1954.

Forms from Secretary.

MANCHESTER. DARBISHIRE HOUSE HEALTH CENTRE. A General Practitioner LOCUM is required for short or long periods up to 4 months commencing immediately. Accommodation in the Centre is available, if required. 20 guineas weekly. Experience in this teaching Health Centre would be valuable for later practice.

Further particulars from the Secretary, Darbishire House Health Centre, 295, Upper Brook-street, Manchester, 13 (Telephone No. Manchester Rusholme 6322).

MANCHESTER, 19. DUCHESS OF YORK HOSPITAL FOR BABIES. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners (Male or Female) for the post of HOUSE PHYSICIAN for 6 months from 1st August, 1954. The Hospital is associated with Manchester University for teaching purposes.

Applications, with copies of 3 testimonials, to be forwarded to the Administrative Officer of the Hospital by 10th July, 1954.

MID-GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following Medical staff appointments, vacant on the dates stated :—

Neath General Hospital (412 Beds)

HOUSE SURGEON (E.N.T. and ophthalmology) ; immediately.
HOUSE SURGEON ; 1st August, 1954.
HOUSE PHYSICIAN ; 1st August, 1954.
HOUSE PHYSICIAN (obstetrics and gynæcology) ; 24th August, 1954.

Port Talbot General Hospital, Hospital-road, Port Talbot (85 Beds) (in association with Neath General Hospital)

SENIOR HOUSE OFFICER (general medicine) ; immediately.

Bridgend General Hospital, Quarella-road, Bridgend (364 Beds)

SENIOR HOUSE OFFICER (pædiatrics) ; 1st August, 1954.
HOUSE SURGEON (obstetrics and gynæcology) ; 1st August, 1954.
HOUSE SURGEON ; 1st August, 1954.
HOUSE SURGEON (orthopædic and traumatics) ; 1st August, 1954.
HOUSE PHYSICIAN ; 1st August, 1954.

Neath General Hospital and Bridgend General Hospital are recognised for the principal Diplomas and are both approved by the General Medical Council for Pre-registration Service under Section 2 of the Medical Act, 1950.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

MARGATE. ROYAL SEA BATHING HOSPITAL. (241 Beds.) SENIOR HOUSE OFFICER. This post, which becomes vacant on 6th July, 1954, is primarily an orthopædic one and affords experience in the treatment of tuberculous and non-tuberculous orthopædic conditions. There are also beds for the treatment of genito-urinary tuberculosis. The post is suitable for candidates for the Primary and the Final F.R.C.S. examinations. Salary £745 p.a., less £150 for residential emoluments.

Applications, with copies of testimonials, to the Medical Superintendent.

NEWARK GENERAL HOSPITAL, Newark. (82 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL OFFICER with general duties required at Registrar rate of pay. This post offers good experience to anyone preparing to enter general practice. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 5th July, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NEWMARKET GENERAL HOSPITAL, Newmarket, SUFFOLK. Applications are invited for the post of HOUSE SURGEON, vacant 26th July. Duties include surgical house charge of general surgical, E.N.T. and eye cases. The post is resident and available for 6 months, and is recognised for pre-registration.

Applications, with copies of 3 recent testimonials, should be addressed to the Physician-Superintendent.

NEWPORT, MONMOUTHSHIRE. ROYAL GWENT HOSPITAL. (260 Beds, 10 residents. Recognised F.R.C.S.) SENIOR HOUSE OFFICER required for Casualty Department beginning of July. This is the base Hospital in the Group and all medical and surgical emergencies are admitted through casualty, which is under the full-time charge of a Senior Hospital Medical Officer, there being also 2 Senior House Officers. Post recognised for F.R.C.S. for 6 months and tenable 6 or 12 months as desired. Salary £745, less £120 for board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary, 64, Cardiff-road, Newport, Mon.

NEWPORT, I.W. ST. MARY'S HOSPITAL. (360 Beds.) ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required as Casualty Officer and House Officer to Consultant Obstetrician and Gynæcologist, vacant August. Salary £745, less residential charge. Modern flat available for married candidate.

Applications, with names of 2 referees, to Hospital Secretary.

NORTHAMPTON. ST. CRISPIN HOSPITAL, Duston, NORTHAMPTON. (1250 Beds.) SENIOR HOUSE OFFICER required. Salary according to national scale. A well-appointed flat is available at the Hospital at moderate rental. The Hospital is approved for training for the D.P.M. of the Conjoint Board and facilities are available in child psychiatry and out-patient clinics locally, and in neurology (at Oxford). There is a modern Admission Unit and an annual admission-rate of over 600 patients annually. Regular case conferences are held.

Applications, giving full details and names of 3 referees, to be sent to the Physician-Superintendent at the Hospital within 14 days.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Locum ANÆSTHETIC REGISTRAR required for 4 weeks commencing 4th July, 1954.

Applications to the Secretary and House Governor.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (post recognised for pre-registration), which is vacant immediately. The post is tenable for 6 months.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (medical). Post vacant 1st August. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered general practitioners for the post of THIRD CASUALTY OFFICER (Senior House Officer grade). Salary (less £150 emoluments) and conditions of service in accordance with those laid down by the Ministry. Duties to commence as soon as possible. This post offers wide experience of casualty work. The Staff establishment requires only 1 night in 3 emergency work, and off duty permits time for study for higher examinations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. 2 Resident HOUSE SURGEONS required (Male or Female, also open to pre-registration candidates) at the above Hospital ; duties to commence as soon as possible. Salary and conditions of service in accordance with published regulations. The appointment is for a term of 6 months.

Applications, stating age, qualifications, and experience, to be sent to HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Required, SENIOR SURGICAL HOUSE OFFICER for the above Hospital, duties to commence at beginning of July, 1954. Salary (less £150 residential emoluments) and conditions of service in accordance with those laid down by the Ministry.

Applications, stating age, qualifications and experience together with copies of testimonials, to be sent to—

General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR ORTHOPÆDIC AND FRACTURE HOUSE OFFICER. (Locum Tenens considered.) The post offers exceptional experience in traumatic and orthopædic surgery. Duties to commence as soon as possible. Salary and conditions of service in accordance with Ministry regulations. If resident £150 deducted for emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female—locum tenens considered) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER; duties to commence as soon as possible. Terms and conditions of service in accordance with published regulations of the Ministry of Health. £150 deducted for residential emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, SENIOR HOUSE OFFICER for the above Hospital. Duties to commence on or about 9th August. Salary £745 p.a., less a deduction of £150 for residential emoluments.

Applications, stating age, qualifications and experience, together with testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

General Hospital, Nottingham.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the following appointments vacant on 1st August, 1954. All are pre-registration posts and the salaries in each case are at the rate of £425, £475, or £525 p.a. according to experience, less £125 p.a. for residential emoluments :—

(1) **Norfolk and Norwich Hospital, Norwich**

(*a*) JUNIOR CASUALTY OFFICER (2 Casualty Officers employed in Department).

(*b*) HOUSE SURGEON (Male or Female). Post recognised for Final F.R.C.S. examination. Duties entirely general surgical.

(2) **Jenny Lind Hospital for Children, Norwich**

(*a*) RESIDENT MEDICAL OFFICER (Male or Female).

(*b*) HOUSE SURGEON (Male or Female).

At Jenny Lind Hospital which forms the entire Prediatric Department of the United Norwich Hospitals. The duties are under the direct supervision of the Consultant staff of the Norfolk and Norwich Hospital.

(3) **West Norwich and Norwich Isolation Hospitals**

HOUSE PHYSICIAN (Male or Female). Duties include acute medical, geriatric and infectious diseases. The beds at these units are under the control of the Consultant Physicians of the Norfolk and Norwich Hospital and the successful candidate will be required to undertake general medical duties under their supervision.

(4) **West Norwich Hospital**

HOUSE SURGEON (Male or Female). Post recognised for Final F.R.C.S. examination. The beds at this Hospital are under the control of the Consultant staff of the Norfolk and Norwich Hospital.

Applications for all the above posts, stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, No. 6 Group Hospital Management Committee, St. Stephen's-road, Norwich.

OXFORD. WARNEFORD AND PARK HOSPITALS. SENIOR HOUSE OFFICER wanted. Warneford Hospital (140 Beds) is developing as an acute Psychiatric Unit, specially related to research and postgraduate teaching. The adjacent Park Hospital is a Neurosis Centre (30 Beds) with daily outpatient clinics. Previous psychiatric experience not essential. This post is specially suitable for training for D.P.M., for which full facilities are available, including neurology and child psychiatry. The post is resident with accommodation for a single man.

Further particulars may be obtained from the Physician-Superintendent, Warneford Hospital, Oxford, to whom application should be sent, with the names of 2 referees, within 14 days.

OTLEY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT MEDICAL OFFICER in the grade of Junior Hospital Medical Officer or alternatively in the grade of Senior House Officer. This appointment is at a busy 170-bedded hospital with full Consultant staff who are members of the Teaching staff of Leeds University, offers good experience in acute general medicine and paediatrics. Duties to commence on or about 25th July, 1954.

Applications, stating full particulars of age, nationality and experience, together with the names of 2 referees to the undersigned as soon as possible.

E. W. BEST, Group Secretary,
Ilkley and Otley Hospital Management Committee.

PETERBOROUGH MEMORIAL HOSPITAL. East ANGLIAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR at above Hospital. The successful candidate will be required to undertake duties in Casualty Department. Post offers wide experience. Appointment for 1 year, renewal for second year.

Detailed applications, including age and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 5th July, 1954. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

PAISLEY. BARSHAW AND THORNHILL MATERNITY HOSPITALS. MATERNITY UNIT. OBSTETRIC HOUSE SURGEONS (2) required for period commencing 1st August, 1954. Salary according to scale.

Applications should be submitted as early as possible to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEONS (2) required for period commencing 1st August, 1954. Salary according to scale.

Applications should be submitted as early as possible to Group Medical Superintendent at above address.

PLYMOUTH. MOUNT GOLD ORTHOPÆDIC HOS-PITAL (with Annexe 122 Beds). PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER for the Orthopædic and Fracture Service, centring on Mount Gold Orthopædic and associate hospitals. Vacancy commences from 1st August, 1954.

Applications, stating age, qualifications with dates, &c., and with copies of 2 recent testimonials, to be forwarded to the Secretary, Mount Gold Hospital, Plymouth, within 14 days of this advertisement appearing.

PLYMOUTH AND DEVONPORT. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEONS, required immediately, also 1st and 15th July, 1954, recognised for the F.R.C.S.

DENTAL HOUSE SURGEON, vacant 1st July, 1954, recognised for the Fellowship.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 27th July, 1954. The appointment will be for a period of 12 months, in the new area laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Applications invited from duly qualified registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Surgery, vacant about 1st August, 1954. The appointment will be for a period of 12 months. The Hospital is recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to the undersigned, closing date 10th July, 1954.

ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MONMOUTHSHIRE. (115 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required immediately. This is the senior resident post, and resident staff consists of 2 House Surgeons, a House Physician and this post. This is a busy acute general hospital with a good Outpatient Department and regular visits from Consultants. Post affords good practical experience in surgery. Salary £775–£50–£1075, less £150 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary.

64, Cardiff-road, Newport, Mon.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000.) SENIOR HOUSE OFFICER (surgical).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000.) HOUSE OFFICERS (surgical) to commence 1st August, 1954 (to include duties at the Porth and District Hospital).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for the F.F.A.R.C.S. and D.A.) SENIOR HOUSE OFFICER (anæsthetics).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000.) SENIOR HOUSE OFFICER (pathology).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOS-PITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for D.C.H.) HOUSE OFFICER (pædiatrics) to commence 1st August, 1954.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for D.Obst.R.C.O.G.) 2 HOUSE OFFICERS (ol stetrics) to commence 1st August, 1954.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for Membership and D.Obst.R.C.O.G.) 2 SENIOR HOUSE OFFICERS (obstetrics and gynæcology).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000.) 2 HOUSE OFFICERS (medical) to commence 1st August, 1954.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

SENIOR HOUSE OFFICER required in the Traumatic and Orthopædic Department (105 Beds). Duties mainly at the Royal Portsmouth Hospital. Vacant now.

Saint Mary's Hospital (74 acute medical beds)

HOUSE PHYSICIAN, vacant 25th July, 1954. Pre-registration post.

Royal Portsmouth Hospital (65 acute medical beds)

HOUSE PHYSICIAN, vacant 20th July, 1954. Pre-registration post.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GYNÆCOLOGICAL HOUSE SURGEON for duties at Queen Alexandra Hospital, Portsmouth, vacant 1st July, 1954. Post recognised for M.R.C.O.G. After expiration of 6 months the successful candidate may be offered House Surgeoncy in obstetrics and gynæcology, at Saint Mary's Hospital, Portsmouth. This post is recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, stating age, experience and qualifications, and names of 2 referees, should be forwarded as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. REDHILL GROUP HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR in Clinical Pathology for appointment to Group Laboratory. Visits by arrangement with Group Pathologist (Telephone : Redhill 3581).

Application forms from Group Secretary at above address.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications are invited from provisionally registered medical practitioners (Male or Female) for the resident post of JUNIOR HOUSE SURGEON (E.N.T.) vacant 1st August, 1954. Salary £425–£475 less £125 board-residence.

Write, stating age, qualifications with dates, nationality, with copy of 1 recent testimonial, to the Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications are invited from registered medical practitioners (Male or Female), for the appointment of RESIDENT ANÆSTHETIST (Senior House Officer grade) vacant immediately for period of 1² months. Recognised for F.F.A.R.C.S. Salary £745 p.a., less £125 p.a. board-residence.

Write, stating age, qualifications with dates, nationality and present post, with copy of 1 recent testimonial, to Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (603 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric and Psychiatric Units at the above Hospital. A wide range of facilities are available at the Hospital for the investigation, treatment and rehabilitation of acute and chronic cases.

Applications, stating age, &c., to be sent to the undersigned by 30th June, 1954. J. C. FIELD, Secretary.

ROCHDALE INFIRMARY. Rochdale and District Hospital MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædics). Post recognised for 6 months for F.R.C.S. examination.

Apply at once to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE. BIRCH HILL HOSPITAL. Rochdale and DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of SENIOR HOUSE OFFICER (obstetrics and gynæcology) now vacant at the above Hospital. The post is for 12 months in the first instance and is recognised for the D.Obst.R.C.O.G.

Applications to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, at once.

ROCHDALE. BIRCH HILL HOSPITAL. Rochdale and DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of HOUSE OFFICER (obstetrics and gynæcology) now vacant at the above Hospital. The position is pre-registration or post-registration and is for 6 months. Recognised for D.Obst.R.C.O.G.

Applications to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, at once.

ROCHDALE. BIRCH HILL HOSPITAL. Rochdale and DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIANS (available for pre-registration). Posts vacant July at above Hospital.

Apply at once, with names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHESTER. ST. BARTHOLOMEW'S HOSPITAL. (Recognised for F.R.C.S.) MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER, vacant now. Post offers good experience with fractures and emergency surgery, and is tenable for 12 months. Salary £670 p.a.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, to be addressed to the Hospital Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit, vacant from 1st July, 1954. The service consists of 100 Beds divided equally between traumatic surgery and " cold " orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required in Neurosurgical Department. Post now vacant. Suitable for candidates seeking higher qualification as it offers excellent experience in neurology.

Apply to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, Essex, as soon as possible.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) SENIOR HOUSE OFFICER in Anæsthetics required from 15th July, 1954. Resident post for Male or Female. Married quarters are available. Good experience, modern equipment. Recognised for D.A. and F.F.A.R.C.S.

Applications to Medical Superintendent. Hospital may be seen by arrangement. Tel. : Romford 7711.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. Post not approved for pre-registration purposes.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required from 1st July, 1954. Post not approved for pre-registration purposes.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

RYDE, I.W. ROYAL I.W. COUNTY HOSPITAL. (116 Beds.) ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN, vacant mid-July. Post recognised for Pre-registration Service.

Applications, with names of 2 referees, to Hospital Secretary.

SALFORD. HOPE HOSPITAL. Salford Hospital Management COMMITTEE. Applications are invited for the following House Officer posts ; which become vacant 26th July, 1954.

3 HOUSE SURGEONS (pre-registration).
3 HOUSE PHYSICIANS (pre-registration).
1 PÆDIATRIC HOUSE OFFICER (post-registration).
1 OBSTETRICAL HOUSE OFFICER (pre-registration).
1 OBSTETRICAL HOUSE OFFICER (post-registration).

Applications, stating age, qualifications, experience and the names of 2 referees, to be forwarded to the Hospital Secretary immediately.

SALFORD. LADYWELL HOSPITAL. Salford Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. Duties will be mainly in the Tuberculosis Unit, but the successful applicant will also be engaged on the geriatric and acute infectious disease wards. The post offers opportunities for study and access to other hospitals within the Group. Salary in accordance with scale. A deduction of £140 p.a. will be made for the cost of board-residence.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be submitted immediately to the Hospital Secretary, Ladywell Hospital, Salford, 5, Lancs.

SELBY (near). GATEFORTH HOSPITAL. Senior House OFFICER. Post vacant 1st August. Appointment for 1 year. 100 male tuberculosis beds. Associated with Thoracic Surgical Unit. Charge for board and lodging £150 p.a. (subject to review).

Applications to Group Secretary, Seacroft Hospital, York-road, Leeds.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time post of MEDICAL REGISTRAR at the Inverness Hospitals. Main duties are at Raigmore Hospital, Inverness.

A form of application and a note of further particulars are obtainable from the undersigned, to whom applications should be submitted by 10th July, 1954.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR HOUSE OFFICER for duties in Infectious Diseases at Ruchill Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience and present appointment and naming 3 referees, to be lodged immediately with the Secretary, Board of Management for Glasgow Northern Hospitals, 13, Woodside-place, Glasgow, C.3.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Tuberculosis based at Dumfries and Galloway Sanatorium, Lochmaben, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 20th July, 1954.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months from 6th August, 1954. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Children's Department. SALISBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of PÆDIATRIC HOUSE OFFICER to the above Department, situated at Odstock Hospital and containing 55 medical and surgical beds. Post recognised for D.C.H.

Applications, stating age, nationality, qualifications, previous posts held, with relevant testimonials, should be submitted immediately to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR for the Area Pathological Service based on the Salisbury General Infirmary. Post vacant 1st September.

Further details and applications forms obtainable from, and must be returned to, the Group Secretary, Odstock Hospital, Salisbury, within 14 days of the appearance of this advertisement.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CONSETT, CO. DURHAM. NORTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (obstetrics and gynæcology) required for 6 months commencing 1st August for duties in Obstetrical (30 Beds) and Gynæcological (43 Beds) Departments. Resident at Richard Murray Maternity Hospital. Recognised for D.Obst.R.C.O.G. Second pre-registration or post-registration appointment.

Apply to the Group Secretary stating age and experience and enclosing copies of 3 recent testimonials.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. JESSOP HOSPITAL FOR WOMEN. Applications invited from registered medical practitioners for the resident post of SENIOR HOUSE OFFICER (obstetrics) at the above Hospital from 1st October, 1954.

Applications, stating age, qualifications and experience together with 3 recent testimonials, should be forwarded immediately to The Superintendent, Jessop Hospital for Women, Leavygreave-road, Sheffield, 3.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident appointment of HOUSE SURGEON (general surgery). Recognised pre-registration post. Vacant on 15th July, 1954.

Applications, giving full details of age, nationality, qualifications, present and previous appointments if any, and the names of 2 persons to whom reference can be made, should be forwarded to W. STANSFIELD at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident appointment of HOUSE PHYSICIAN (general medicine)—recognised pre-registration post, vacant on 15th July, 1954.

Applications, giving full details of age, nationality, qualifications, present and previous appointments if any, and the names of 2 persons to whom reference can be made, should be forwarded to W. STANSFIELD at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident appointment of HOUSE SURGEON (orthopædics). Recognised pre-registration post. Vacant on 15th July, 1954.

Applications, giving full details of age, nationality, qualifications, present and previous appointments if any, and the names of 2 persons to whom reference can be made, should be forwarded to W. STANSFIELD at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. Locum SENIOR HOUSE OFFICER (anæsthetics) required.

Apply, stating period for which available, to the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for D.C.H.) Applications are invited for the resident appointment of HOUSE PHYSICIAN (pædiatrics). Recognised pre-registration post. Vacant 1st July, 1954.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to W. STANSFIELD, at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD REGIONAL HOSPITAL BOARD. Applications are invited for the posts of REGISTRAR in Psychiatry in the following hospitals: Carlton Hayes, near Leicester; Mapperley, Nottingham; Pastures, near Derby; and Middlewood, Sheffield; to commence in October, 1954. These posts form a part of the joint training scheme in psychiatry sponsored by the Newcastle and Sheffield Regional Hospital Boards. Full particulars of the posts may be obtained from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield.

Applications should be made to the Secretary of the Board, by 12th July, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT SENIOR REGISTRAR in Chest Diseases for the Leicester Isolation Hospital and Chest Unit, Groby-road, Leicester. Clinical duties mainly concerned with chest work but candidates should have general medical experience and special experience in the treatment of chest diseases and tuberculosis. Appointment for 1 year in the first instance, reviewable annually.

Applications giving age, nationality, qualifications, present and previous appointments with dates, and naming 3 referees, to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 12th July, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Resident Locum SURGICAL REGISTRAR required immediately at King's Mill Hospital, Sutton-in-Ashfield. Remuneration at rate of £16 per week with a deduction for residence.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Resident Locum REGISTRAR (chest diseases) required immediately at Oakwood Hall Sanatorium and Chest Clinic, Rotherham. Remuneration at the rate of £16 per week with a deduction for residence.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SHREWSBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from general registered practitioners (Male or Female) for the appointment of RESIDENT HOUSE SURGEON in General Surgery. Now vacant. Recognised for the F.R.C.S., and approved for Pre-registration Service.

Applications, with references, should be sent to the Secretary, Group 15 Hospital Management Committee, Royal Salop Infirmary, Shrewsbury.

SOUTHAMPTON CHEST HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time REGISTRAR in Anæsthetics to the Thoracic Surgical Unit of the above Hospital, becoming vacant in October, 1954. This Unit deals with all types of thoracic surgical cases. Candidates are invited to visit the Unit, if they so desire.

Forms of application may be obtained from the undersigned, to whom they should be returned not later than 10th July, 1954.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds— 80 surgical.) 2 HOUSE SURGEONS required middle and end of July, 1954. Posts tenable for 6 months. Both recognised for F.R.C.S. and Pre-registration Service.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER/SENIOR HOUSE OFFICER (orthopædic) required for the above Hospital (Orthopædic Unit 74 Beds). This Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (278 Beds) AND SOUTHAMPTON GENERAL HOSPITAL (471 Beds). SENIOR HOUSE OFFICER (E.N.T.) required immediately. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work, including audiometry. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as a Whole-time REGISTRAR in Urology to fill a vacancy in the Canterbury Group of hospitals, for duty mainly at the Kent and Canterbury Hospital, Canterbury, and also at the Royal Sea Bathing Hospital, Margate, in the Isle of Thanet Group of hospitals, where there is work in genito-urinary tuberculosis. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 10th July, 1954.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Part-time REGISTRAR in Dermatology required from 1st August for:—

(i) 2 half-day sessions a week at St. Helier Hospital, Carshalton, Surrey;
(ii) 1 half-day session a week at Kingston Hospital.

Application forms obtainable from, and returnable to, Group Secretary, St. Helier Hospital, Carshalton, Surrey, by 10th July.

SUTTON-IN-ASHFIELD. KING'S MILL HOSPITAL. (172 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance. Apart from the Surgical Unit there are also E.N.T. and Gynæcological Units at this Hospital.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 5th July, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR SURGICAL REGISTRAR required 19th July–9th August. Person engaged may be required to do emergency work at other hospitals in the Group ; possession of car an advantage.

Applications, together with copies of 3 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE OFFICER (casualty) required (1 of 2) for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications, together with names of 2 referees, to Hospital Secretary.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (382 Beds.) Locum JUNIOR HOSPITAL MEDICAL OFFICER required for the Gynæcological and Obstetric Department at the above Hospital from 21st July to 10th August, 1954.

Applications to the Group Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (382 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 general surgical teams. (Recognised for the F.R.C.S.) Post vacant about 2nd August, 1954, and tenable for 6 months. Preference given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications to the Group Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (382 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical teams for duties mainly on the acute wards. Post vacant about 28th July, 1954, and tenable for 6 months. Preference given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications to the Group Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

STROUD GENERAL HOSPITAL, Stroud, Gloucestershire. 2 SENIOR HOUSE OFFICERS required. 1 for medicine and 1 for surgery.

Applications, naming 2 referees, to the Hospital Secretary, Stroud General Hospital, Stroud, Glos.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds.) HOUSE PHYSICIAN (Male or Female). Post or pre-registration candidate considered. Post vacant 1st July.

Applications, giving full particulars and copies of 3 recent testimonials, to the Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—32 Bed Recovery Unit.) STAFFORD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (Male or Female). Post or pre-registration candidates considered. Post vacant 17th July.

Applications, giving full particulars and copies of 3 recent testimonials, to the Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (pædiatrics) required. Recognised pre-registration post, vacant 7th July.

Detailed applications, with copy testimonials, should be forwarded to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER in Pædiatrics. Post recognised for D.C.H. Vacant 21st August.

Applications, with copy testimonials, and details of previous experience, should be forwarded to the Group Secretary, Hospital Management Committee, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (medical), vacant 7th August. Recognised for experience during pre-registration period.

Apply, with copy testimonials, stating age, nationality and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for HOUSE OFFICER (general surgery), vacant now. Hospital recognised for F.R.C.S. examinations, and the post is recognised for experience during the pre-registration period.

Apply, with copy testimonials, stating age, nationality and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for SENIOR HOUSE OFFICER (orthopædics). Post recognised for F.R.C.S.

Apply, stating age and nationality, together with details of previous service, to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (medical) required. Post vacant 1st July, 1954. Recognised for pre-registration experience.

Applications, with copy testimonials, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (475 Beds.) GYNÆCOLOGY DEPARTMENT. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. Post recognised for M.R.C.O.G. and/or for pre-registration (surgery). Experience in abnormal obstetrics available, but the work is mostly gynæcological.

Applications, with details and 2 testimonials, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SWANSEA HOSPITAL. (403 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of SENIOR HOUSE OFFICER in the Surgical Unit of the above Hospital. Vacancy 1st July, 1954. The Hospital is recognised for the F.R.C.S. (Eng.) examinations.

Applications, stating age, qualifications and experience, should be forwarded to the Group Secretary, Glantawe Hospital Management Committee, St. Helen's-road, Swansea.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. TAUNTON AND SOMERSET HOSPITAL. (Musgrove Park and East Reach Branches.) Applications are invited for the appointment of SENIOR RESIDENT OFFICER (surgical) in the grade of Senior House Officer. The Officer appointed would be the Senior Resident Officer of both branches of the Hospital. The post, which gives excellent experience in surgery, including operating work according to qualifications and experience, is recognised by the Royal College of Surgeons as a qualifying appointment for the Final Fellowship examination.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to reach the Secretary, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset, not later than 2nd July, 1954.

TREDEGAR GENERAL HOSPITAL. (20 miles from Newport and 24 from Teaching Hospital in Cardiff ; 6 miles from the Vale of Usk, Surgical Unit of 50 Beds, with also 6 orthopædic beds, under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Out-patient and Casualty Departments.)

1 JUNIOR HOSPITAL MEDICAL OFFICER.
1 HOUSE SURGEON (pre-registration if suitable candidate available).

Junior Hospital Medical Officer : salary £775–£50–£1075, less agreed deduction for married quarters (if required). House Officer post tenable 6 months : salary £425–£525, less agreed deduction for married quarters or £125 p.a. for single residential emoluments.

Apply, with full particulars, to the Group Secretary, Hospital Management Committee, St. Martin's-road, Caerphilly, near Cardiff.

TYNEMOUTH VICTORIA JUBILEE INFIRMARY, Hawkey's-lane, NORTH SHIELDS. The resident post of HOUSE PHYSICIAN becomes available in July. Appointment recognised for Pre-registration Service.

Applications should be sent to the Group Secretary, Preston Hospital, North Shields, Northumberland.

VENTNOR, ISLE OF WIGHT. ROYAL NATIONAL HOSPITAL FOR DISEASES OF THE CHEST (249 Beds). Required:—

JUNIOR HOSPITAL MEDICAL OFFICER, and
SENIOR HOUSE OFFICER.

Resident posts. Hospital has all facilities for major thoracic surgery.

Applications, with names of 2 referees, to Physician-Superintendent.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for the post of HOUSE SURGEON (Male or Female), recognised for pre-registration, at the above Hospital. National Health Service terms and conditions. The staffing of the Surgical Unit consists of a Senior Registrar, Registrar and 2 House Surgeons. The post offers a comprehensive training in surgery.

Apply, giving full particulars, to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (Resident Casualty Officer). The commencing salary is in accordance with the scale £700–£50–£1000, less a deduction of £130 for residential emoluments. Applications will also be considered for a short-term period on a week-to-week basis.

Applications, stating age, experience and qualifications, should be forwarded or telephoned to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital (Tel. No. 1666), Warrington, Lancs.

WARRINGTON INFIRMARY. Warrington and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from qualified practitioners for the vacancy of RESIDENT ANÆSTHETIST (Senior House Officer grade), Male or Female, at the Warrington Infirmary. Scale of salary £670 p.a., less £130 p.a. for residential emoluments.

Applications to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington.

WARWICK HOSPITAL. (264 Beds.) South Warwickshire HOSPITAL GROUP. Applications are invited for the resident appointment of HOUSE SURGEON (House Officer), pre-registration, vacant end of July. Good experience in general surgery available. Candidates taking final examination may apply.

Applications, with 2 testimonials, to be forwarded to the Medical Superintendent, Warwick Hospital, Lakin-road, Warwick.

WARWICK HOSPITAL. (264 Beds.) South Warwickshire HOSPITAL GROUP. HOUSE PHYSICIAN (resident) required. Post vacant end of July. Pre-registration or registered candidates may apply.

Applications, together with 2 testimonials, to be forwarded to the Medical Superintendent, Warwick Hospital, Lakin-road, Warwick.

WARWICK (near). CENTRAL MENTAL HOSPITAL. SENIOR HOUSE OFFICER required on 1st September in this Mental Hospital of 1400 Beds with Neurosis Unit, 4 adult and 2 child psychiatry clinics recognised for the D.P.M., and Departments of Electro-encephalography, Occupational Therapy, Psychology and social work. A modern house is available.

Applications, together with the names and addresses of 3 referees, to the Medical Superintendent within 14 days of the appearance of this advertisement.

WARWICK (near). KING EDWARD VII MEMORIAL SANATORIUM, Hertford Hill, near WARWICK. (Diseases of the Chest—225 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Sanatorium, which is a modern building, to take up duties in July. All forms of therapy and minor surgery are carried out and the Sanatorium works in close association with a major Thoracic Surgery Unit in a nearby hospital, which will be transferred to the Sanatorium in the near future.

Applications, together with the names of 3 referees, should be forwarded to the Medical Superintendent as soon as possible.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments, vacant 1st August :—

Manor Hospital (333 Beds)
HOUSE SURGEON (1 vacancy).
HOUSE PHYSICIAN (2 vacancies).
General Hospital (181 Beds)
HOUSE SURGEON (2 vacancies).
HOUSE PHYSICIAN (1 vacancy).
All above posts recognised pre-registration.

Applications to Secretary, with names of 2 referees.

WELLINGBOROUGH. PARK HOSPITAL. (201 Beds.) KETTERING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER to the Geriatric Unit of 40 Beds, at present non-resident, and vacant now. The unit is in close association with a similar larger unit at Kettering.

Applications, stating age, nationality, qualifications, and past experience, should be sent to the Group Secretary, General Hospital, Kettering.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (200 Beds.) CASUALTY OFFICER (pre-registration post), vacant 1st July, 1954. Recognised for F.R.C.S. examinations.

Applications, together with names of 2 referees, to Secretary, Royal Infirmary, Wigan.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required (Male or Female), for post vacant 13th August. Recognised for F.R.C.S. Preference given to persons seeking pre-registration House Officer post under the Medical Act, 1950. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates and experience with copies of 3 testimonials, to Hospital Secretary by 11th July.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)
SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.
SENIOR HOUSE OFFICER (Anæsthetist), vacant now.
HOUSE OFFICER (Casualty Department), vacant now.
*3 HOUSE OFFICERS (general surgery), 2 vacant 30th June, 1 vacant now.
*HOUSE OFFICER (pædiatrics). Appointment recognised for D.C.H. Vacant 16th July.

New Cross Hospital, Wolverhampton
*HOUSE OFFICER (general surgery), vacant now.
SENIOR HOUSE OFFICER (obstetrics). Appointment recognised for D.Obst.R.C.O.G. Vacant 5th July.
*Approved for Pre-registration Service.

Wolverhampton Eye Infirmary
Part-time NON-RESIDENT CLINICAL ASSISTANT required, 3 sessions weekly, Monday, Wednesday, and Friday mornings. Duties in association with Consultants, mainly refraction work at morning outpatient clinics. D.O. an advantage.

Applications, with copies of 3 recent testimonials, to be sent to Group Secretary,
The Royal Hospital, Wolverhampton.

WESTON-SUPER-MARE GENERAL HOSPITAL. (110 Beds.) Applications are invited from registered medical practitioners for the resident appointment, vacant mid-August, of HOUSE PHYSICIAN (non pre-registration). The appointment is for 6 months in the first instance and may be renewed for a further 6 months.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WESTON-SUPER-MARE GENERAL HOSPITAL. (110 Beds.) Applications are invited from registered medical practitioners for the resident appointment of HOUSE SURGEON (non pre-registration). The appointment will be for a period of 6 months in the first instance and may be renewed for a further 6 months.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WEST BROMWICH AND DISTRICT GENERAL HOSPITAL, Edward-street, WEST BROMWICH. (144 Beds.) WEST BROMWICH AND DISTRICT HOSPITALS MANAGEMENT COMMITTEE GROUP NO. 18. Applications are invited for the post of HOUSE SURGEON, vacant immediately. Salary, terms and conditions in accordance with the Ministry of Health regulations. The post is tenable for 6 months, resident, and is recognised for Pre-registration Scheme.

Applications, together with 3 recent testimonials, should be submitted to J. O. ROBINS, Esq., Group Secretary.

WEST BROMWICH. HALLAM HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology), for the Group Laboratory at this Hospital. Duties at other hospitals in the Group may be included. Previous experience in pathology not essential.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to the Pathologist, as soon as possible.

WATFORD AND DISTRICT PEACE MEMORIAL HOS-PITAL. (189 Beds.) Applications are invited for the post of HOUSE PHYSICIAN. Post recognised for pre-registration. Vacant middle of July. Salary according to National Health Service scale.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to—
CYRIL HOPKINSON, Administrator.

YORKSHIRE. EAST RIDING HOSPITAL MANAGE-MENT COMMITTEE.

Westwood Hospital, Beverley, E. Yorks (207 Beds)
(*a*) HOUSE SURGEON (first, second, or third post), vacant now. General surgical duties, some orthopædics. Offering good opportunity for general experience in busy acute General Hospital. Recognised for F.R.C.S. Approved pre-registration post. Married accommodation available.

(*b*) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post), vacant now. Offers good opportunity for general experience in busy acute General Hospital. Approved pre-registration post. Married accommodation available.

(*c*) ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory, with attendance at Branch Laboratory, Driffield. Offers experience all branches pathology.

East Riding General Hospital, Driffield, Yorks (269 Beds)
(*d*) HOUSE SURGEON (first, second, or third post), vacant now. Approved pre-registration post. General surgical duties. Recognised for F.R.C.S.

Broadgate (Mental) Hospital, Beverley, E. Yorks (650 Beds)
(*e*) HOUSE PHYSICIAN (first, second, or third post), vacant now.

Salary for (*a*), (*b*), (*d*) and (*e*) is £425–£525, and for (*c*) is £745. Fully qualified practitioners may apply for the pre-registration posts.

Detailed applications to Group Secretary, Westwood Hospital, Beverley, Yorks.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE.

York County Hospital (Acute Hospital of 269 Beds with full Consultant staff)
CASUALTY OFFICER (with charge of orthopædic beds), resident or non-resident. Junior Hospital Medical Officer grade, vacant immediately. Salary £775–£50–£1075, less £153 if resident. Recognised for F.R.C.S.

York. Fairfield Sanatorium (63 Beds); **City Hospital** (265 Beds)
Required immediately, SENIOR HOUSE OFFICER in Chest Diseases and General Medicine to spend half time at Fairfield Sanatorium (63 Beds) and at the City Hospital, where 8 Beds are reserved for investigation of chest cases, and where outpatient refill clinics are held, the remainder of time at County and City General Hospitals (269 and 265 Beds respectively), in Department of General Medicine. Previous experience in treatment of tuberculosis an advantage. Salary £745. A furnished flat is available at a reasonable rental, or accommodation may be provided temporarily.

York Military Hospital (Civilian Wing) (60 Beds)
Required immediately, SENIOR HOUSE OFFICER (resident or non-resident). There are 18 gynæcological beds, 30 general surgical beds, and 12 medical beds. The Hospital is associated with the County Hospital (general hospital of 269 Beds) where relief casualty and emergency work and relief work for House Surgeons may be undertaken and where residence can be provided. Salary £745, less £153 if resident. A furnished flat is available at reasonable rental.

Applications, giving age, nationality, experience, qualifications, and names of 2 referees, immediately to the Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

CASTLEREA. ST. PATRICK'S REGIONAL CHEST HOSPITAL. ROSCOMMON COUNTY COUNCIL. Applications are invited from suitably qualified persons for the temporary post of REGISTRAR to the Thoracic Surgical Unit at above Hospital. Applicants must since registration have had not less than 3 years practice, including 2 years satisfactory experience in surgery. It is preferable that 6 months of this 2 years shall have been spent in a recognised teaching hospital. Previous experience in thoracic surgery is desirable but not essential. Salary £800 p.a., inclusive of all existing temporary bonuses, subject to a deduction of £150 p.a., in respect of full residential emoluments, where provided in kind.

Applicants should communicate with the undersigned at once, giving full particulars as to date and place of birth, qualifications and experience, and state how soon could take up duty, if appointed. T. D. WYER, County Secretary.

Courthouse, Roscommon, 14th June, 1954.

NEWFOUNDLAND PROVINCIAL DEPARTMENT OF HEALTH

ST. JOHN'S GENERAL HOSPITAL (475 Beds)
ST. JOHN'S, NEWFOUNDLAND
DEPARTMENT OF ANÆSTHESIA

Applications are invited to fill the post of RESIDENT ANÆSTHESIA REGISTRAR. Previous experience in anæsthetics desirable. Salary is $3600 (approximately £1292) p.a., less $600 (approximately £215) for maintenance, &c. Passage will be paid to St. John's as well as return fare to the United Kingdom on completion of 12 months service.

Applications with full details should be forwarded immediately to Dr. E. Wilson, Superintendent, General Hospital, St. John's, Newfoundland.

LEONARD MILLER, M.D., Deputy Minister of Health.

NEWFOUNDLAND PROVINCIAL DEPARTMENT OF HEALTH

ST. JOHN'S GENERAL HOSPITAL (475 Beds)
ST. JOHN'S, NEWFOUNDLAND
DEPARTMENT OF PATHOLOGY

Applications are invited to fill the post of RESIDENT REGISTRAR in Pathology. Duties will include clinical, surgical and autopsy pathology. Previous experience in pathology desirable but not essential. The post is recognised for postgraduate training and towards Certification in Pathology by the Royal College of Surgeons and Physicians of Canada and the American College of Surgeons. Excellent opportunities exist for gaining extensive experience. Salary is $3200 (approximately £1149) p.a., less $480 (approximately £172) for maintenance, &c. Passage will be paid to St. John's as well as return fare to the United Kingdom on completion of 12 months service.

Applications with full details should be addressed to Dr. E. Wilson, Superintendent, General Hospital, St. John's, Newfoundland.

LEONARD MILLER, M.D., Deputy Minister of Health.

IRELAND. INCORPORATED ORTHOPÆDIC HOSPITAL OF IRELAND, Castle-avenue, CLONTARF, DUBLIN. (142 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT MEDICAL OFFICER, vacant now. Post offers good experience and opportunities for postgraduate study. Tenable for 12 months. Salary according to experience, minimum £250 p.a.

Applications, stating age, qualifications and experience, to be addressed to the Hospital Secretary.

NEW YORK. ALBANY HOSPITAL, Albany, New York, U.S.A. NEUROLOGY RESIDENCIES available in 700-Bed University-Teaching, General Hospital. Salary range $1620–$2220 annually, plus laundry, uniforms and room.

Address inquiries to Medical Director.

NEW YORK. NEW ROCHELLE HOSPITAL, New ROCHELLE, NEW YORK, U.S.A. (360-Bed general community hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by American College of Surgeons and American Medical Association for Internship and Residency Training. Only graduates from approved university schools accepted. Term of Internship: 1st July, 1954–30th June, 1955. INTERNES—$150 per month plus full maintenance. Return passage to England paid by Hospital after completion of internship.

Apply Superintendent.

UNITED STATES. MOUNT AUBURN HOSPITAL, CAMBRIDGE, MASSACHUSETTS. Applications are invited for anesthesiology approved 2-year RESIDENCY beginning 1st September, 1954. 1st April, 1955, and 1st July, 1955. This is a 250-Bed community hospital. Teaching programme included. Salary $1800 first year and $3000 second year and full maintenance. Travel expense to and from the United States will be paid.

Apply: Director of Anesthesiology, P.O. Box 115, Cambridge, 38, Massachusetts.

Public Appointments

ANGLESEY. COUNTY OF ANGLESEY. Applications are invited from medical practitioners holding the D.P.H. or similar qualification for the appointment of ASSISTANT COUNTY AND SCHOOL MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH for the Borough of Beaumaris, the Urban Districts of Llangefni and Menai Bridge and the Rural District of Aethwy. Salary in accordance with the national award for a mixed appointment—£1368 15s., rising to £1687 10s. Starting-point according to experience. The national conditions of service, travelling allowances, &c., apply.

Application forms to be returned to the undersigned by 10th July, 1954, may be obtained from the County Medical Officer, Shire Hall, Llangefni.

WILLIAM JONES, Clerk of the County Council.

Shire Hall, Llangefni.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER. Applications are invited from registered medical practitioners for this whole-time superannuable post. Salary £950 p.a. by annual increments of £50 to £1300 p.a., plus a car allowance.

Application forms are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's-gate, Derby, to whom they should be returned by 14th July.

BAHRAIN, PERSIAN GULF. GOVERNMENT OF BAHRAIN MEDICAL DEPARTMENT invites applications from British Women Doctors for the post of ASSISTANT to the Lady Medical Officer in charge of Women's medical services. Age 30–40. Minimum salary £1584, no allowances, rising by annual increments of £45. Starting salary on incremental scale according to age up to 40. Non-contributory gratuity on retirement. Private practice among Europeans only. No income-tax. Agreement for 2 years, renewable by mutual consent. Free quarters with hard furniture and car. Home leave amounts to 2½ months on full pay for every years service. Free return air passage every 2 years.

Applications should be addressed to Messrs. CHAS. KENDALL & PARTNERS LTD., 7, Albert-court, Kensington Gore, London, S.W.7.

BOARD OF CONTROL. Whole-time Deputy Medical SUPERINTENDENT (Consultant), at Rampton Hospital, near Retford, Notts (1143 Beds), for patients exhibiting conduct disorders with mental deficiency. Excellent opportunities for study, treatment and training of behaviour disorders of all kinds and degrees. Applicants must be registered medical practitioners, with experience in psychiatry and the D.P.M.; post is clinical, but experience in hospital administration an advantage; duties may involve attendance at outpatient clinics. Appointment on National Health Service conditions of service and superannuation regulations. House on the estate available at appropriate rental.

Applications, stating name, date and place of birth, nationality, details of education, professional qualifications, war service, present and previous appointments, and names of 3 referees, to Medical Superintendent, Rampton Hospital, Retford, Notts, by 16th July, 1954. Envelopes to be marked A/DMS. Canvassing in any form leads to disqualification. Candidates may visit Hospital by appointment with Medical Superintendent.

HER MAJESTY'S COLONIAL SERVICE. Trinidad. MEDICAL OFFICERS OF HEALTH required. Duties include matters relating to sanitation, public health education, venereal diseases, tuberculosis, maternity and child welfare, school medical work, housing and town planning. Appointment can be made on a permanent basis with pension (non-contributory) at the age of 60, or on short-term agreement. A candidate in the National Health Service may resign from the National Health Service but retain his superannuation rights during his time in the Colonial Service (up to 6 years) and receive a resettlement grant of 20% of the aggregate of his Colonial salary on leaving the Colonial Service at the end of his engagement. Salary scale ranges from B.W.I. $5280 to B.W.I. $5760 (£1100–£1200) p.a. A temporary variable cost-of-living allowance is at present payable at the rate of $108 p.a. (1 B.W.I. $ equals 4s. 2d.) Starting salary is determined in accordance with the candidate's age, qualifications and experience. A revision of salaries is being undertaken in Trinidad and Officer selected would benefit from any increase granted. Pension is earned at the rate of 1/600th of the final pensionable emoluments for each completed month of service. Provision of quarters not guaranteed, but if government quarters are provided a small rental is charged. Where government quarters are not provided an allowance in lieu is payable. Free passages on first appointment are provided for Officer and family not exceeding 5 persons in all, also free passages on leave subject to a maximum of 3 adult fares. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour. Tour of service is 3½ years. Educational facilities are available. Candidates must possess qualification registrable in the United Kingdom and must also hold the Diploma in Public Health.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/38/014).

HER MAJESTY'S COLONIAL SERVICE. Nigeria. A SPECIALIST (Alienist) is required in the Medical Department, Eastern Region, Nigeria. Duties comprise organisation of mental services, training of staff and advising on establishment of new mental hospitals in the Region; investigation, diagnosis and classification of the various forms of mental cases and advice on their treatment and disposal; administration of preventive medicine and clinical work. Appointment, which is for 5 years, may be made as follows:—

(*a*) From the National Health Service. Candidates may resign from the National Health Service, but retain their superannuation rights during their time in the Colonial Service and receive a resettlement grant of 20% of the aggregate of their Colonial salary on leaving the Colonial Service at the end of their engagement. Salary, including expatriate allowance, amounts to £2025 a year.

(*b*) On contract with inclusive salary of £2195 a year. On completion of contract a gratuity is paid at the rate of £37 10s. for each completed period of 3 months service (including leave).

Extramural Consultant practice permitted under certain conditions.

Tours of service are from 18 to 24 months. Quarters are provided at low rents. Free passages in both directions are provided for officer and his wife. Payment of the cost actually incurred on 1 outward and 1 homeward passage for each of 2 children under age of 18, subject to a maximum of £75 in respect of the return journey for each child, is also granted. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour. Candidates must possess a medical qualification registrable in the United Kingdom, and a Diploma in Psychological Medicine, and have had at least 3 years experience in the diagnosis and treatment of mental cases.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/14/025).

COATBRIDGE. BURGH OF COATBRIDGE. Applications are invited from registered medical practitioners possessing the Diploma in Public Health for appointment as ASSISTANT MEDICAL OFFICER OF HEALTH of the Burgh. The salary scale is £950 p.a. rising by annual increments of £50 to £1300 p.a. Placing on the scale may be granted according to qualifications and experience. Main duties will be in respect of Child Welfare, Immunisation and Vaccination Services and such other duties as may be required by the Medical Officer of Health. The post is superannuable and the successful applicant will be required to pass a medical examination.

Applications, giving particulars of qualifications, experience and appointments held, with copies of testimonials, should be lodged with the undersigned within 14 days of the appearance of this advertisement. ALEXANDER S. THOM, Town Clerk.

Municipal Buildings, Coatbridge, 14th June, 1954.

DEWSBURY. COUNTY BOROUGH OF DEWSBURY. Applications are invited for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER of the County Borough of Dewsbury. Applicants should be registered medical practitioners and possession of a Diploma in Public Health is desirable but not essential. Preference will be given to candidates approved previously by the Ministry of Education for ascertainment of educationally subnormal children. The salary will be within the scale £1100–£50–£1300 p.a., the commencing salary being fixed in accordance with qualifications and experience, plus a car allowance (at present £108 p.a.). Housing accommodation will be available if required. The appointment is permanent and superannuable and the successful candidate will be required to pass a medical examination.

Particulars of the duties and other conditions of the appointment, together with application forms, may be obtained from the Medical Officer of Health, Municipal Buildings, Halifax-road, Dewsbury, Yorkshire, to whom applications should be sent within 14 days after the appearance of this advertisement.

A. NORMAN JAMES, Town Clerk.

Town Hall, Dewsbury, 16th June, 1954.

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Medical position vacant. PHYSICIAN (part-time), Limerick Co. Council. Salary: £1000. The duties will be performed mainly in the Regional Hospital, Limerick.

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 9th July, 1954.

DUNDEE. CORPORATION OF DUNDEE. Public Health DEPARTMENT. ASSISTANT MEDICAL OFFICER OF HEALTH (School Health Service). Applications are invited from duly qualified medical practitioners under 45 years of age for the above post. Possession of a D.P.H. or equivalent will be an advantage. The salary will be in accordance with the national scale. The selected candidates will require to pass a medical examination and contribute to the superannuation scheme. The Corporation reserve the right to terminate the appointment of female officers on marriage.

Applications, giving age, qualifications, and experience, and the names of 3 referees, should reach the undersigned on or before 17th July, 1954.

City Chambers, Dundee. ROBERT LYLE, Town Clerk.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
PERSHORE ..	WORCESTER ..	10TH JULY, 1954

IPSWICH. COUNTY BOROUGH OF IPSWICH. Appointment of DEPUTY MEDICAL OFFICER OF HEALTH, DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER AND DEPUTY PORT MEDICAL OFFICER. Salary scale £1233 6s. 8d.–£50–£1483 6s. 8d. Commencing salary may be determined having regard to the previous local authority service of the successful candidate. Applicants must be duly registered medical practitioners possessing the D.P.H., and preference will be given to those who have had previous experience in relation to the School Health and Mental Health Services.

Application forms and conditions of service will be forwarded on application to the Medical Officer of Health, Elm-street, Ipswich.

Town Hall, Ipswich. J. C. NELSON, Town Clerk.

NORTHAMPTON COUNTY BOROUGH EDUCATION COMMITTEE. Applications are invited from Men or Women candidates for the post of ASSISTANT SCHOOL DENTAL OFFICER. Salary scale £900–£50–£1250–£75–£1400 p.a. 1 increment for each year of experience in practice may be allowed up to a maximum of 5 years. The appointment will be superannuable.

Particulars and forms may be obtained from the undersigned, to whom applications should be returned within 2 weeks of the appearance of this advertisement.

H. A. SKERRETT, Chief Education Officer.

"Springfield," Cliftonville, Northampton.

WEST HAM. COUNTY BOROUGH OF WEST HAM. EDUCATION COMMITTEE. Applications are invited from registered medical practitioners for the whole-time post of ASSISTANT MEDICAL OFFICER. Duties mainly in Child Health Services. Possession of D.P.H., C.P.H., or D.C.H. and previous experience with children is desirable. Salary £950–£50–£1300. In fixing the commencing salary allowance may be made for similar service elsewhere.

Applications by 12th July, 1954, on forms from School Medical Officer, 49A, Broadway, London, E.15. Further particulars on request.

R. OPENSHAW, Chief Education Officer.

Education Offices, 95, The Grove, E.15.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

BARNES, SURREY. Applications invited for retirement VACANCY in above urban area. List about 700. Practice of lady doctor for many years and list contains large proportion of female patients. Residence and surgery may be available for purchase. "Intermediate" area. Applications, on Form E.C.16A, to reach the undersigned on or before 9th July, 1954.

S. H. BENNETT, Clerk, Surrey Executive Council.

187, Ewell-road, Surbiton, Surrey.

BIRMINGHAM, KINGS NORTON. Applications invited for VACANCY (residential area) due to resignation. List approximately 1850. Residence and surgery available. Apply on E.C.16A not later than 14th July, 1954, to—

K. F. G. DAY, Clerk of Birmingham Executive Council.

Sutton New-road, Erdington, Birmingham, 23.

GODALMING, SURREY. Applications invited for death VACANCY at Farncombe in above urban area. List about 2200. No residence but surgery likely to be available temporarily. "Intermediate" area. Applications, on Form E.C.16A, to reach the undersigned on or before 9th July, 1954.

S. H. BENNETT, Clerk, Surrey Executive Council.

187, Ewell-road, Surbiton, Surrey.

WOMBWELL, YORKSHIRE. Applications are invited for appointment to a Practice VACANCY caused by the resignation of 2 practitioners who practised in partnership. Total list 5031. Living and surgery accommodation available for purchase. Apply on Form E.C.16A, before 3rd July, 1954, to the undersigned from whom further particulars may be obtained.

C. H. STABLER, Clerk of the Council.

The West Riding Executive Council,
5, St. John's-north, Wakefield.

Miscellaneous

To non-professional posts the notification of Vacancies Order 1952 applies.

Psychologist to handle work in two 150-bedded General Hospitals in Northern Saskatchewan city of 20,000 population. Expected remuneration $10,000–$12,000 p.a., plus limited outside work.—Address, No. 943, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

William Collins Sons & Co. Ltd. Applications are invited from medical practitioners for the post of Medical Officer to the Health Service of this firm. The person appointed would, in addition to the medical work, be responsible for the Welfare Services of the Company. Candidates should have experience in general practice, hold a higher qualification and be under 35 years of age. Salary will be within the scale recommended by the B.M.A. for Industrial Medical Officers. The post is superannuated.—Applications, giving details of age and experience should reach the Secretary, William Collins Sons & Co. Ltd., 144, Cathedral-street, Glasgow, C.4, not later than 2nd July, 1954.

A whole-time Medical Officer required by a large indus- trial group for 1 of its works in Lincolnshire. The Group has a well-established Medical Service. A man with industrial experience and knowledge of industrial hazards preferred but not essential. Starting salary in region of £1500 p.a.—with prospects of advancement. Contributory pension scheme.—Please reply, giving full details of qualifications, age and experience, to Address, No. 945, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Assistant Medical Officer required in large works in Monmouthshire. Previous knowledge of industry not essential. Excellent opportunity for young man wishing to make Industrial Medicine his career. Starting salary £1200. Contributory pension scheme.—Please reply, giving full details of qualifications, age and experience, to Address, No. 944, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

British Guiana Sugar Producers' Association have a vacancy for a Medical Officer on their Sugar Estates. Experience of tropical medicine an advantage but not a necessity. Minimum salary £1500 p.a., but more would be paid for good qualifications. Free quarters with basic furniture. Pension scheme. Travelling allowance. Initial engagement for 3 years followed by 3 months leave in the United Kingdom with first-class passages paid both ways for employee, wife, and children up to 16 years.—Apply, in writing only, to BOOKERS SUGAR COMPANY LIMITED, 37/41, Gracechurch-street, E.C.3.

Mandeville-place, W.1. Several entire floors, each approximately 2200 square feet, available in first-class Professional building shortly to be erected. Lift and central heating. —For preliminary details apply: Managing Agents, CHRISTIE & Co. (Ref. 17), 7, Baker-street, W.1.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

For sale: Coll. Papers Mayo Clinic Vols. XI–XLI (1919–49), also Vols. XII–XV (1920–23), Vols. XVII–XXIX (1925–37); St. Bart's Hosp. Rep. 1930–35; Brit. M.J. 1932–4 (bound); Journal A.M.A. 2, 1940 (Vol. 115) (bound). What offers?—JOHNSON, 57, East-parade, Harrogate.

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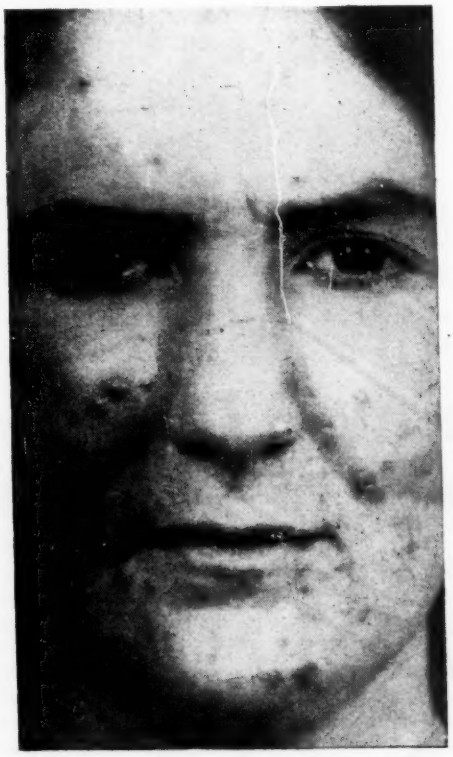

'. . . the presence of disease upon the surface of the skin *is a source of great mental distress to the patient. It is ever in his consciousness, setting him apart from his fellows . . .'**

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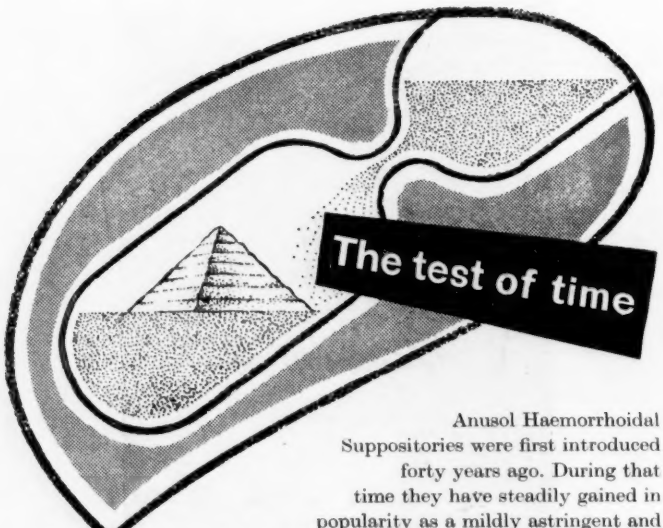

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Bismuth subgallate, 2.12%, Bismuth oxyiodogallate, 0.03%, Bismuth oxide, 0.87%, Resorcin, 0.87%, Balsam of Peru, 1.77%, Zinc oxide, 10.60%, Boric acid, 17.85%, Base of cacao butter and beeswax, q.s. ad 100.00%.

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